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ABSTRACT

The Division of Science Resources Studies (SRS) of the National Science Foundation (NSF) designs and conducts surveys and supports other data collection activities. This document is a guide to the recurring portions of the SRS data bases, including information on survey design, sample size, and data content. The abstracts found in this guide provide a minimum introduction to these sources. Data are included on: (1) a national survey of natural and social scientists and engineers; (2) the number of earned doctorates awarded in the United States; (3) characteristics of doctoral scientists and engineers; (4) recent science and engineering graduates; (5) science and engineering personnel employed at universities and colleges; (6) research participation and characteristics of science and engineering faculty; (7) scientific and technical personnel in private industry; (8) federally employed scientists and engineers; (9) foreign scientists and engineers; (10) science and technology funding sources; and (11) science and technology inputs and outputs. (TW)

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ED287686

A Guide to NSF

Science/Engineering Resources Data

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Directorate for Scientific, Technological, and International Affairs
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SE 048 640

NSF 87-308

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1987

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The National Science Foundation (NSF) has Telephonic Device for the Deaf (TDD) capability which enables individuals with hearing impairment to communicate with the Division of Personnel and Management for information relating to NSF programs, employment, or general information. The number is (202) 357-7492.

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Identifiers—*National Science Foundation

The National Science Foundation (NSF) Division of Science Resources Services designs and conducts surveys related to, and supports other data collection activities dealing with, science resources. The data from these surveys and data collection efforts are used by NSF and others to analyze various research and development (R&D) funding and scientific and technical labor market issues. This document, a guide to the recurring portions of these databases, provides information on survey scope, sample size, pertinent variables, and survey instrument (copy included where appropriate). Surveys described are presented in three sections. They are: (1) scientific and technical resources--experienced scientists and engineers, doctoral recipients, federally employed scientists and engineers, scientific and technical personnel employed at universities and colleges, recent science and engineering graduates, doctorate records file, survey of graduate science and engineering students and postdoctorates, and foreign scientists and engineers; (2) science and technology funding resources--federal funds for R&D; industrial R&D; federal support to universities, colleges, and selected nonprofit institutions; and scientific and engineering expenditures at universities and colleges; and (3) science and technology inputs and outputs--science indicators literature database and counts of patents applied for and granted in the United States. (JN)

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NSF Science/Engineering (S/E) Resources Data

Survey name	Frequency	First year of data availability	Most recent data (as of Jan. 1987)
Scientific and technical human resources:			
National Survey of Natural and Social Scientists and Engineers	Biennial	1972	1984
Earned Doctorates Awarded in the United States	Annual	1957	1985
Characteristics of Doctoral Scientists and Engineers	Biennial	1973	1985
Recent Science and Engineering Graduates	Biennial	1976	1984
Graduate Science and Engineering Students and Postdoctorates	Annual	1972	1985
Scientific and Engineering Personnel Employed at Universities and Colleges	Annual since 1973	1954	1985
Research Participation and Characteristics of Science and Engineering Faculty	Periodic	1968	1986
Scientific and Technical Personnel in Private Industry	Annual, 3-year cycle	1977	1986
Federally Employed Scientists and Engineers	Annual[1]	1954	1986
Foreign Scientists and Engineers	Annual	1966	1986
Science and technology funding resources:			
Federal Funds for Research and Development	Annual	FY 1967	FY 1986
Federal Support to Universities, Colleges, and Nonprofit Institutions	Annual since 1968	FY 1963	FY 1985
Scientific and Engineering Expenditures at Universities and Colleges	Annual since FY 1972	FY 1963	FY 1985
Industrial Research and Development	Annual	1953	1985
Science and technology inputs and outputs:			
Academic Research Instrumentation Needs	Biennial	1983	1985
Science Indicators Literature Data Base	Annual[1]	1973	1984
Counts of Patents Applied for and Granted in the U.S.	Biennial	1963	1985

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[1] Earlier data from these surveys were used by NSF in analytic reports; complete time-series data are not available from NSF.

introduction

Among the many missions assigned to the National Science Foundation (NSF) by the Congress is the authority and responsibility to "...appraise the impact of research upon industrial development and upon the general welfare; to provide a central clearinghouse for the collection, interpretation, and analysis of science and engineering resources ... to initiate and maintain a program for the determination of the total amount of money for scientific research ..." [PL81-507, Sec.3.(a)] .

In pursuit of these objectives, the Division of Science Resources Studies (SRS) designs and conducts surveys and supports other data collection activities dealing with scientific and technical (S/T) personnel, S/T funding, and inputs/outputs to the S/T enterprise. The information collected by SRS is used by senior policy officials within Federal organizations. such as the Office of Management and Budget (OMB), the Congress, and NSF in support of analyses related to science policy issues. These data are also used by employers and educators to assess the current, and project the future, S/T environment.

This document is a guide to the recurring portions of the SRS data bases including information on survey design, sample size, and data content. The abstracts found in this Guide provide a minimum introduction to these data sources. More complete descriptions can be found in the technical notes to SRS publications. These notes provide technical detail and also contain copies of the most current survey instruments.

Data available from SRS surveys are disseminated via an electronic bulletin board system; on diskettes prepared for IBM-compatible microprocessors; or from the National Technical Information Service (NTIS). The bulletin board contains information on most recent survey data and synopses of major findings; diskettes contain detailed statistical tables based on data from the individual surveys. Inquiries concerning surveys should be directed to the individual at the address and telephone number cited in the text of this Guide. Public-use tapes with microdata are also available when permitted by law; the Guide provides information on how to obtain them.

Further information on SRS publications may be obtained by contacting:

Mrs. Elizabeth Michael
Office of the Division Director
Division of Science Resources Studies
National Science Foundation
1800 G Street, N.W., Rm. L611
Washington, D.C. 20550
(202) 634-4622

scientific and technical human resources

national survey of natural and social scientists and engineers

purpose and background

The National Survey of Natural and Social Scientists and Engineers (NSSE) (also referred to as the Survey of Experienced Scientists and Engineers) provides data on the number and characteristics of individuals who were identified as being part of the science and engineering (S/E) population at the start of the decade. A biennial series of surveys, the NSSE provides a longitudinal profile of scientists and engineers who were drawn from a sample based on the 1980 Census of Population. This survey is the primary data set underlying the Scientific and Technical Personnel Data System (STPDS) which is designed to measure the educational, demographic, and employment characteristics of the Nation's scientists and engineers. The STPDS is comprised of three data sets providing information on particular S/E subpopulations.

The initial survey in this series for the eighties was conducted in 1982. Followup surveys were conducted in 1984 and 1986; others are scheduled for 1989 and 1991.

survey instrument

The data content of this survey, with minor exceptions, is fixed during the decade. Respondents are asked to provide information on their education and training (level and field of degree); demographic characteristics (sex, age, race, Hispanic origin, handicapped status, etc.); employment status (including information on full/part-time status and, if applicable, reasons for non-S/E employment); and employment profile (occupation, type of employer, primary work activity, salary, work experience, etc.).

sample design

The original sample, approximately 138,000, was selected from respondents to the 1980 Census of Population. The sample was stratified on the basis of education, occupation, sex, and race. Because the survey is longitudinal, requiring reinterviewing of a panel of respondents, the response rate will suffer some attrition over the course of the decade. The expected response rate for the 1986 survey is 80 percent.

data availability

Data are available from the 1982 and 1984 surveys. Data from the 1986 survey will be available in fall 1987. Similar surveys were conducted in the seventies based on a sample of individuals drawn from the 1970 Census of Population. Data from this earlier panel are available for 1972, 1974, 1976, and 1978. Due to changes in the underlying samples, survey methodology, and refinements in population definition, data for the two decades are not strictly comparable.

data access

Summary data from this survey are not published separately. Data from the seventies and eighties panel surveys have been reconciled by NSF and incorporated into the STPDS in order to generate national estimates of the S/E population. National estimates for specialized cross tabulations are available annually from 1976. Summary statistical tables reporting recent data from the STPDS are available on diskettes designed for use on an IBM-compatible microprocessor.

Inquiries regarding the survey should be addressed to:

Ms. Nancy Conlon
Division of Science Resources
Studies
Scientific and Technical Personnel
Characteristics Studies Group
Natonial Science Foundation
1800 G Street, N.W., Rm. L611
Washington, D.C. 20550
(202) 634-4664

Inquiries regarding national estimates generated from the STPDS should be directed to Ms. Melissa Lane at the same address and telephone number.

Public-use tapes containing data from the 1982 and 1984 surveys can be purchased for $165. Data from the surveys conducted in the seventies are also available. Inquiries should be addressed to:

Mr. Forrest Williams
Data Users Services Division
Customer Services
Bureau of the Census
Washington, D.C. 20233
(301) 763-4100

NOTICE — Your report to the Census Bureau is **confidential** by law (Title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes.

FROM THE DIRECTOR
BUREAU OF THE CENSUS

The Bureau of the Census is again conducting the National Survey of Natural and Social Scientists and Engineers to update information relating to the Nation's scientific and technical personnel. We conduct this survey every 2 years under the sponsorship of the National Science Foundation and the Department of Energy. We appreciate your cooperation in 1984 and are again asking for your assistance. Even if you are retired, not working, or currently working in a position unrelated to science or engineering, we urge you to complete the questionnaire to add to the knowledge of our Nation's use of highly trained and educated personnel.

Because of the rapid developments and innovations in science and technology during recent years, it is important to know how these changes affect the highly trained and educated people in the fields of engineering, and the natural and social sciences. The National Science Foundation uses the information collected in this survey as mandated by law to prepare biennial reports, which provide numbers and characteristics of the scientific and technical population. The survey data enable government agencies to assess the scientific and engineering resources available in the United States in relation to the needs of businesses, industries, and universities and to provide a basis for the Nation's science and engineering policies.

We are collecting this information under the authority of the National Science Foundation Act of 1950, as amended by Title 42, United States Code, Section 1862. Title 13, United States Code, obligates the Census Bureau to keep all information provided by respondents in the strictest confidence. We can only use your answers to prepare statistical summaries. Such summaries preclude the identification of any survey participant.

Please answer the questions that begin on page 2 and return your questionnaire in the enclosed, addressed envelope as soon as possible. Some questions ask you to enter a code and description from Reference List A, B, or C. We are enclosing a Reference List Guide for your use. Participation in this survey is voluntary, and there are no penalties for failing to answer questions. However, your cooperation is vital to ensure the completeness and accuracy of final results.

Thank you for your cooperation. Your Census Bureau appreciates your help.

Sincerely,

John G. Keane

JOHN G. KEANE

Enclosures

OMB No. 3145-0071: Approval Expires January 31, 1988

FORM **SSE-60**
(1-24-86)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

1986 NATIONAL SURVEY OF NATURAL AND SOCIAL SCIENTISTS AND ENGINEERS

001 1

PLEASE COMPLETE AND RETURN TO

Bureau of the Census
ATTN: Current Projects Branch
1201 East Tenth Street
Jeffersonville, Indiana 47132

Please read instructions carefully before answering questions.

Answer as accurately as you can by printing your reply clearly or by entering an "X" in the box next to the appropriate reply.

If the instructions for a question direct you to enter a code and description from a list, please refer to the Reference List Guide that is enclosed.

IF YOU HAVE MOVED, or if there are errors in the address label above, please enter the correct information about your name and current residence below.

Name

Number and street

City or town

State or foreign country 002 ☐☐☐ ZIP Code

Part I — EDUCATION AND TRAINING

1. Since May 1984 have you attended any college, university, or other post high school institution?

101 1 ☐ Yes — *GO to 2a*
2 ☐ No — *GO to 4*

2a. What is the highest degree, if any, you have RECEIVED since May 1984?

Mark (X) only one box.

102 1 ☐ Associate
2 ☐ Registered Nurse (R.N.)
3 ☐ Bachelor's
4 ☐ Master's
5 ☐ First Professional Non-Medical (e.g., J.D., LL.B., Th.B.)
6 ☐ First Professional Medical (e.g., D.D.M., D.D.S., D.O., D.V.M., M.D.)
7 ☐ Doctorate
8 ☐ Other — *Specify* — ____________
GO to 2b
9 ☐ None — *GO to 3a*

b. When was this degree awarded?

If you received more than one degree at the same level (e.g., two master's degrees), enter the year of award of the most recent one.

103 19 _____

c. What was the major field of study for this degree?

Enter code and description from Reference List A.

104 Code ☐☐☐ Description from Reference List A ____________

3a. Are you currently attending a college or university?

105 1 ☐ Yes — *GO to 3b*
2 ☐ No — *GO to 4*

b. Are you a full-time or part-time student?

106 1 ☐ Full-time
2 ☐ Part-time

3c. Are you enrolled as a graduate or an undergraduate student?

107 1 ☐ Graduate
2 ☐ Undergraduate

d. What field of study are you pursuing?

Enter code and description from Reference List A.

108 Code ☐☐☐ Description from Reference List A ____________

☐ Not pursuing a specific field of study

4. Which of the following kinds of training, if any, did you participate in during 1984 or 1985?

Mark (X) the appropriate year for each type of training you received.

	1984	1985
(1) Courses at your employer's training facility.	**109** * 1 ☐	**110** * 1 ☐
(2) Courses at an adult education center.	2 ☐	2 ☐
(3) Courses presented in conjunction with professional meetings.	3 ☐	3 ☐
(4) Courses presented by professional training organizations (commercial or non-profit).	4 ☐	4 ☐
(5) Extension or correspondence courses.	5 ☐	5 ☐
(6) Military training.	6 ☐	6 ☐
(7) Other training.	7 ☐	7 ☐
(8) None	8 ☐	8 ☐

FORM SSE-60 (1-24-86)

PART II — DEMOGRAPHIC CHARACTERISTICS

5. As of March 9, 1986, what was your marital status?

111 1 ☐ Married
2 ☐ Widowed
3 ☐ Separated
4 ☐ Divorced
5 ☐ Never married

6a. Did you have any children living with you as of March 9, 1986 who were 6 - 17 years of age?

112 1 ☐ Yes
2 ☐ No

b. Did you have any children living with you as of March 9, 1986 who were under 6 years of age?

113 1 ☐ Yes
2 ☐ No

7a. Are you physically handicapped?

114 1 ☐ Yes — *GO to 7b*
2 ☐ No — *GO to 8*

b. What is the nature of your handicap(s)?

Mark (X) all that apply.

115 1 ☐ Visual
2 ☐ Auditory
3 ☐ Ambulatory
4 ☐ Other — *Specify*

____

Part III — EMPLOYMENT STATUS

8. During the week of March 9, 1986, were you —

116 1 ☐ Working full time (35 hours or more per week in at least one position) — *GO to 13a*
2 ☐ Working part time — *GO to 9*
3 ☐ Not working, but seeking work — *GO to 12*
4 ☐ Not working and not seeking work — *GO to 10*

9. Were you seeking full-time work?

117 1 ☐ Yes
2 ☐ No
} *GO to 13a*

10. Did you look for work at any time during the 3 weeks PRIOR to the week of March 9, 1986?

118 1 ☐ Yes
2 ☐ No

11. What was the MAIN reason you were not working and not seeking work during the week of March 9, 1986?

Mark (X) only one box.

119 1 ☐ On vacation or otherwise temporarily absent from a job for health or personal reasons } *GO to 13a*
2 ☐ On layoff from a job
3 ☐ Retired
4 ☐ Student
5 ☐ Family responsibilities
6 ☐ Chronic illness or permanent disability
7 ☐ Could not find work or believed no jobs available in my particular field
8 ☐ Did not want to work
9 ☐ New job to begin within 30 days
10 ☐ Waiting for school to begin
11 ☐ Other — *Specify*

____

____
} *GO to 23, page 5*

12. If you were not working but were seeking work during the week of March 9, 1986, was your job search restricted by —

120 1 ☐ Geographic location
2 ☐ Family responsibilities
3 ☐ Need for part-time employment
4 ☐ Other — *Specify*

____

5 ☐ Not restricted
} *GO to 23, page 5*

13a. During the week of March 9, 1986, were you working at (or temporarily absent from) a position related to the natural sciences, social sciences, or engineering?

121 1 ☐ Yes — *GO to 14a*
2 ☐ No — *GO to 13b*

b. What was the most important reason that you were NOT working at a position related to science or engineering?

Mark (X) only one box.

122 1 ☐ Preferred nonscience or nonengineering position
2 ☐ Promoted out of science or engineering position
3 ☐ Pay was better in nonscience or nonengineering position
4 ☐ Locational preference
5 ☐ Science or engineering position not available
6 ☐ Other — *Specify*

____

____

PART IV — EMPLOYMENT PROFILE

In this part of the questionnaire, we are asking questions about your job held during the week of March 9, 1986, regardless of the type of work involved (including a military service job). If you had more than one regular job during the week of March 9, 1986, record information for the one which you consider to be your PRINCIPAL employment.

14a. For whom did you work?

Enter name of company, business organization, government agency, or other employer (or self-employed). ↘

____

____

____

b. In what city and state did you work?

City or town	State or foreign country	123			

15a. How would you classify the organization for which you work?

(Please enter code from Reference List B, "Employer Classification List". If the organization conducts its activities at different locations, enter the code for the activity at the location where you are employed.)

124 Code ☐☐☐

b. What kind of work were you doing?

Enter the code and description of your occupation from Reference List C.

125 Code ☐☐☐ Description from Reference List C ↘ ______________________________

16. Which category best describes the type of organization of this job?

Mark (X) only one box.

126
- 01 ☐ Self-employed
- 02 ☐ Business or industry
- 03 ☐ Junior college, 2-year college, technical institute
- 04 ☐ Medical school
- 05 ☐ 4-year college or university, other than medical school
- 06 ☐ Elementary or secondary school system
- 07 ☐ Hospital or clinic
- 08 ☐ Non-profit organization, other than hospital, clinic, or educational institution
- 09 ☐ U.S. military service (active duty), or Commissioned Corps, e.g., USPHS, NOAA
- 10 ☐ U.S. Government, civilian employee
- 11 ☐ State government
- 12 ☐ Local or other government — *Specify* ↘ ______________________________
- 13 ☐ International agency
- 14 ☐ Other — *Specify* ↘ ______________________________

17a. Did you have more than one job during the week of March 9, 1986?

127
- 1 ☐ Yes — *GO to 17b*
- 2 ☐ No — *GO to 18*

b. Which one of the categories in item 16 above best describes the type of organization of your second job?

Enter the appropriate code (01 – 14) from item 16 above.

128 ☐☐ Second job

Remarks

PART IV — EMPLOYMENT PROFILE — Continued

18. From the following work activities, which was your primary work activity and which was your secondary work activity for your job reported in item 14, in terms of time devoted for a typical week?

Enter the appropriate code (01—16) for each in the specified box.

PLEASE NOTE: **Basic research** is study directed toward gaining scientific knowledge primarily for its own sake.

Applied research is study directed toward gaining scientific knowledge in an effort to meet a recognized need.

Development is direction of the knowledge gained from research toward production of useful materials, devices, systems, and methods.

Code
01 —Management or administration of research and development
02 —Management or administration of other than research and development
03 —Teaching and training — preparing and teaching courses, guiding and counseling students or trainees
04 —Basic research
05 —Applied research
06 —Development — product, process, and technical development
07 —Report and technical writing, editing, information retrieval
08 —Clinical diagnosis, psychotherapy
09 —Design of equipment, processes, models
10 —Quality control, testing, evaluation, or inspection
11 —Operations — production, maintenance, construction, installation, exploration
12 —Distribution — sales, traffic, purchasing, customer and public relations
13 —Statistical work — survey work, forecasting, statistical analysis
14 —Consulting
15 —Computer applications
16 —Other activities — *Specify* ↴

____

129 ☐☐ Primary work activity

130 ☐☐ Secondary work activity

19. During a typical week in your job reported in item 14, what percent of working time did you devote to each of these activities?

Entries should total 100%.

131 ________ % Primary work activity
132 ________ % Secondary work activity
133 ________ % Other activities
100.0 **TOTAL**

20a. For your job reported in item 14, what was your basic annual salary as of March 1986?

Exclude bonuses, overtime, summer teaching, etc.

134 $ ____________ . 00 Per year
0 ☐ None

b. Were you employed by an educational institution?

135 1 ☐ Yes — *GO to 20c*
2 ☐ No — *GO to 21*

c. Was your salary paid on a 9 or 10 month basis or an 11 or 12 month basis?

136 1 ☐ 9—10 months
2 ☐ 11—12 months

21. What was your basic annual salary in 1985 for your job reported in item 14?

Exclude bonuses, overtime, summer teaching, etc.

137 $ ____________ . 00 Per year
0 ☐ None

22. What was your total professional income in 1985 including basic annual salary, bonuses, overtime, summer teaching, consulting fees, etc.?

138 $ ____________ . 00 In 1985
0 ☐ None

23. During calendar year 1985 —

(a) How many weeks did you work? *Include weeks of paid vacation, paid sick leave, and military service.*

139 ________ Weeks

(b) How many weeks were you without a job, but seeking work?

140 ________ Weeks

(c) How many weeks were you not working and not seeking work?

141 ________ Weeks
52 Weeks *Entries for (a), (b) and (c) above should total 52 weeks.*

PART IV — EMPLOYMENT PROFILE — Continued

24. How many years of professional work experience, including teaching, have you had?

142 _______ Years

0 ☐ None

25. Based on your total education and experience, what do you regard yourself as professionally? (If retired, prior to retirement.)

Enter code and description from Reference List C.

143 Code ☐☐☐ Description from Reference List C ________________

26a. During the week of March 9, 1986, was any of your work at your job reported in item 14 supported by U.S. Government funds? (If retired or unemployed during that week, skip to item 29.)

144
1 ☐ Yes — *GO to 26b*
2 ☐ No } *GO to 27*
3 ☐ Don't know } *GO to 27*

b. Which of these agencies or departments were supporting your work? *Mark (X) all that apply.*

145
1 ☐ AID (Agency for International Development)
2 ☐ Department of Agriculture
3 ☐ Department of Commerce
4 ☐ Department of Defense
5 ☐ Department of Energy
6 ☐ Department of Education (NIE, OE, NCES)
7 ☐ Department of Health and Human Services
8 ☐ Department of Housing and Urban Development
9 ☐ Department of the Interior
10 ☐ Department of Justice
11 ☐ Department of Labor
12 ☐ Department of Transportation
13 ☐ EPA (Environmental Protection Agency)
14 ☐ NASA (National Aeronautics and Space Administration)
15 ☐ NSF (National Science Foundation)
16 ☐ Nuclear Regulatory Commission
17 ☐ Other — *Specify* ________________
18 ☐ Don't know source agency

27. From this list of selected areas of national interest, indicate the ONE area to which you devoted the MOST professional time during a typical week at the job reported in item 14. *Mark (X) only one box.*

146
1 ☐ Energy and fuel — *GO to 28a*
2 ☐ Health
3 ☐ Environment
4 ☐ Education
5 ☐ National defense
6 ☐ Agriculture
7 ☐ Mineral resources
8 ☐ Community development and service
9 ☐ Housing (planning, design, construction)
10 ☐ Transportation
11 ☐ Communications
12 ☐ Technological development
13 ☐ Space
14 ☐ Other — *Specify* ________________

} *GO to 29a*

28a. What percent of your professional time did you devote to energy and fuel during a typical week?

147
1 ☐ 100 percent
2 ☐ 75 to 99 percent
3 ☐ 50 to 74 percent
4 ☐ 25 to 49 percent
5 ☐ 24 percent or less

b. From this list, mark the ONE energy source that involved the LARGEST proportion of your energy-related work during a typical week.

148
1 ☐ Coal and coal products
2 ☐ Petroleum (including oil shale and tar sands) or natural gas
3 ☐ Fission
4 ☐ Fusion
5 ☐ Hydroenergy
6 ☐ Direct solar (including space and water heating, thermal, electric)
7 ☐ Indirect solar (winds, tides, biomass, etc.)
8 ☐ Geothermal
9 ☐ Other — *Specify* ________________

c. Please read this list of energy-related activities and mark the item(s) that best describe the activity(ies) in which you were engaged during a typical week at the job reported in item 14. *Mark (X) all that apply.*

149
01 ☐ Exploration
02 ☐ Extraction (gas, oil, mining)
03 ☐ Manufacture of energy-related components or products
04 ☐ Fuel processing (including refining and enriching)
05 ☐ Electric power generation
06 ☐ Transportation, transmission, distribution of fuel or energy
07 ☐ Energy storage
08 ☐ Energy utilization, management
09 ☐ Fuel reprocessing or disposal
10 ☐ Energy conservation
11 ☐ Environmental impact (health, economic, etc.)
12 ☐ Education, training
13 ☐ Other — *Specify* ________________

d. Please enter the number of the activity from the above list (28c) that best describes the activity in which you spent MOST of your energy-related time.

Enter the appropriate code number (01 to 13) from item 28c above.

150 ☐☐ Activity

Part V — OTHER INFORMATION

29a. In the event it is necessary to contact you to clarify some of the information you provided, may we contact you by telephone?

1 ☐ Yes — *GO to 29b*
2 ☐ No — *GO to 30*

b. What is the telephone number at which you can be reached?

151

Area code	Number

c. What is an alternate telephone number at which you can be reached?

152

Area code	Number

30. Please enter the name and address of a person, other than yourself and at an address other than yours, through whom you can be reached.

153

Name

Number and street

City or town

State or foreign country

ZIP code

Remarks

Thank you for completing this questionnaire.
Please return the completed form in the enclosed addressed envelope.

FORM SSE-60 (1-24-86)

☆U. S. GOVERNMENT PRINTING OFFICE: 1986/646-009/20214

FORM **SSE-65**
(12-13-85)

U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

REFERENCE LIST GUIDE

1986 NATIONAL SURVEY OF NATURAL AND SOCIAL SCIENTISTS AND ENGINEERS

REFERENCE LIST A — MAJOR FIELDS OF STUDY

This list is to be used in answering questions 2c and 3d about the field in which you are studying or have obtained a degree. It is a list of fields of academic study generally leading to bachelor's or higher degrees.

Please scan the entire list, choose the appropriate answer for the question, and then enter the code and description in questions 2c and 3d. If none of the categories listed below adequately describes the field in which you are currently studying or have obtained a degree, use the "Other" category (code 241) and enter a brief description of the field of study in the space provided on the questionnaire.

Code	Description
	Biological and Agricultural Sciences and Related Fields
101	Agriculture, business
102	Agriculture, general
103	Agronomy, field crops
104	Anatomy, histology
105	Animal physiology
106	Animal science
107	Bacteriology, virology, mycology, parasitology
108	Biochemistry
109	Biology, general
110	Biometrics and biostatistics
111	Biophysics
112	Botany, general
113	Cell biology
114	Dairy sciences (dairy husbandry)
115	Ecology
116	Embryology
117	Entomology
118	Farm management
119	Fish and game or wildlife management
120	Food science (food technology and processing, dairy manufacturing and technology, food industry)
121	Forestry
122	Genetics
123	Horticulture
124	Immunology
125	Marine biology
126	Microbiology
127	Molecular biology
128	Natural resources management
129	Neurosciences
130	Nutrition
131	Pathology, human and animal
132	Pathology, plant
133	Physiology, human and animal
134	Physiology, plant
135	Poultry sciences
136	Radiology
137	Soil sciences (soil management, soil conservation)
138	Toxicology
139	Zoology, general
140	Biological and agricultural sciences, other fields
	Education
141	Biological sciences education
142	Guidance and counseling
143	Mathematics education
144	Physical sciences education
145	Social sciences education
146	Education, other fields
	Engineering
147	Aerospace, aeronautical, astronautical and related fields
148	Agricultural
149	Architectural
150	Bioengineering and biomedical engineering
151	Chemical, petroleum refining

Code	Description
	Engineering *(Continued)*
152	Civil, construction, transportation
153	Computer
154	Electrical, electronics, communications
155	Engineering sciences, mechanics, physics
156	Engineering technology
157	Environmental, sanitary engineering
158	General or unified
159	Geological engineering
160	Geophysical engineering
161	Industrial
162	Mechanical
163	Metallurgical, materials, ceramics
164	Mining, mineral, geological
165	Naval architecture and marine engineering
166	Nuclear
167	Ocean engineering
168	Petroleum
169	Textile engineering
170	Engineering, other fields
	Health Fields
171	Medicine or premedicine, and clinical medical sciences
172	Nursing (4 years or longer program)
173	Pathology
174	Pharmacology
175	Pharmacy
176	Health professions, other fields (4 years or longer)
	Mathematical Sciences
177	Actuarial sciences
178	Applied mathematics
179	Computer science
180	Mathematics
181	Operations research/management sciences
182	Statistics
	Physical Sciences
183	Analytical chemistry
184	Astronomy
185	Astrophysics
186	Atmospheric sciences and meteorology
187	Atomic—molecular physics
108	Biochemistry
188	Chemistry, general
189	Earth sciences, general
190	Elementary particles and fields
191	Geology
192	Geochemistry
193	Geophysics and seismology
194	Inorganic chemistry
195	Metallurgy
196	Nuclear physics

Code	Description
	Physical Sciences *(Continued)*
197	Oceanography
198	Organic chemistry
199	Paleontology
200	Pharmaceutical chemistry
201	Physical chemistry
202	Physical sciences, general
203	Physics, general
204	Solid state physics
205	Other, earth sciences
206	Other, physical sciences
	Psychology
207	Clinical
208	Counseling
209	Developmental
210	Educational
211	Experimental
212	Industrial/organizational
213	Physiological
214	Psychology, general
215	Psychometrics
216	Social
217	Psychology, other fields
	Social Sciences
218	Anthropology
219	Criminology
220	Economics, agricultural
221	Economics, except agricultural
222	Geography
223	Political science and government
224	Sociology
225	Social sciences, other fields
	Arts, Humanities, and Other Specialties
226	Architecture
227	Area studies
228	Arts, general
229	Business and commerce, including accounting, hotel and restaurant administration, and secretarial studies
230	English and journalism
231	Fine and applied arts, all fields
232	Foreign language and literature, all fields
233	History
234	Home economics, all fields
235	Law or prelaw
236	Library science
237	Military science, including merchant marine deck officer
238	Philosophy, all fields
239	Religion and theology, all fields
240	Social work
241	Other *(Describe briefly in the applicable item on questionnaire.)*

REFERENCE LIST B — EMPLOYER CLASSIFICATION LIST

This list is to be used in answering question 15a about the classification of your employer. Please scan the entire list, choose the appropriate answer for the question and enter the code from this list. If none of the categories listed below adequately describes your employer's classification, use the "Other" category (code 436).

Code	Description
	Manufacturing
401	Primary metals products
402	Fabricated metals products
403	Computers and computing equipment
404	Nonelectrical machinery (including engines and turbines, construction machinery, metal working, and industrial machinery; and excluding computing and computing equipment)
	Electrical equipment
405	Household appliances (excluding radios and televisions)
406	Radios and televisions
407	Other electrical equipment (including electric motors, transmissions equipment, and generators)
	Transportation equipment
408	Aircraft, aircraft engines and parts
409	Motor vehicles and equipment
410	Guided missiles and space vehicles and parts
411	Other transportation equipment (including railroad and parts)
412	Ordnance (including arms manufacture and ammunition)
413	Professional and scientific instruments
414	Chemicals and allied products
415	Petroleum and coal products, including petroleum refining
416	Other manufacturing
417	**Construction**
	Mining and petroleum extraction
418	Coal mining
419	Petroleum and gas extraction
420	Other mining
	Transportation, communication, and utilities
421	Transportation
422	Communications
423	Utilities and sanitary services
	Wholesale and retail trade
424	Wholesale trade
425	Retail trade
426	**Finance, insurance, and real estate**
	Services
427	Computer and data processing services
428	Engineering, architectural, and surveying services
429	Other services
430	**Educational institutions**
431	**Uniformed military service**
	Government
432	Federal
433	State
434	Local
435	Other
436	**Other**

REFERENCE LIST C — OCCUPATIONS

This list is to be used in answering questions 15b and 25 about your occupational and professional classification. Please scan the entire list, choose the appropriate entry, and enter the code and description from this list. If you cannot find exactly the right entry, please choose the one that comes nearest to it. If none of the entries is at all appropriate, use the "Other" category (code 792) and enter a brief description in the space provided on the questionnaire. Note that codes 701—745 include college professors and instructors.

Code	Description
	Engineers, including college professors and instructors
701	Engineer, aeronautical, aerospace, or astronautical
702	Engineer, agricultural
703	Engineer, chemical
704	Engineer, civil or architectural
705	Engineer, computer
706	Engineer, electrical or electronic
707	Engineer, environmental or sanitary
708	Engineer, industrial
709	Engineer, marine engineer or naval architect
710	Engineer, mechanical
711	Engineer, metallurgical or materials
712	Engineer, mining or geological
713	Engineer, nuclear
714	Engineer, petroleum
715	Engineer, sales
716	Engineer, systems
717	Engineer, other fields *(Describe briefly in the applicable item on questionnaire.)*
	Computer Specialists, including college professors and instructors
718	Computer programmer
719	Computer scientist
720	Computer systems analyst
721	Other computer specialists *(Describe briefly in the applicable item on questionnaire.)*
	Mathematicians, Statisticians and other Mathematical Scientists, including college professors and instructors
722	Actuary, including actuarial mathematician
723	Mathematician
724	Operations research analyst
725	Statistician
726	Systems analyst, except computer systems or data processing (see code 720)
727	Other mathematical scientists *(Describe briefly in the applicable item on questionnaire.)*
	Physical Scientists, including college professors and instructors
728	Atmospheric scientist, meteorologist, space scientist
729	Chemist, except biochemist
730	Earth scientist, including geologist, geophysicist, geodesist, etc.
731	Oceanographer
732	Physicist, astronomer
733	Other physical scientists, e.g., geographer, environmental scientist, materials scientist, etc. *(Describe briefly in the applicable item on questionnaire.)*

Code	Description
	Biological Scientists, including college professors and instructors
734	Agricultural scientist, food scientist, fishery biologist
735	Biochemist
736	Biological scientist, life scientist, botanist, ecologist
737	Biophysicist
738	Forestry or conservation scientist, including foresters and conservationists
739	Medical scientist, excluding persons who are primarily medical practitioners (see Health Occupations)
740	Other biological scientists *(Describe briefly in the applicable item on questionnaire.)*
	Social Scientists, including college professors and instructors
741	Anthropologist
742	Economist, including market research analysts
743	Psychologist
744	Sociologist
745	Other social scientists, e.g., demographer, political scientist, etc. *(Describe briefly in the applicable item on questionnaire.)*
	Health Occupations, including persons who are primarily practitioners. Persons engaged primarily in medical research, teaching, and similar activities use code 739, Medical scientist.
746	Dental hygienist
747	Medical technician
748	Physician or surgeon
749	Other health occupations, e.g., dentist, pharmacist, practical and registered nurse, etc. *(Describe briefly in the applicable item on questionnaire.)*
	Technicians and technologists, except medical and health
750	Designer, electronic parts
751	Designer, industrial
752	Designer, machine tools
753	Designer, other
754	Drafting occupations, including draftsman
755	Technician, architectural
756	Technician, biological and agricultural
757	Technician, construction and highway
758	Technician, electrical and electronic
759	Technician, industrial engineering
760	Technician, mechanical engineering
761	Technician, other engineering
762	Technician, surveying and mapping (Surveyors, see code 791)
763	Technician, other science
764	Technician, other fields *(Describe briefly in the applicable item on questionnaire.)*

Code	Description
	Teachers
765	Teacher, elementary school
766	Teacher, secondary school
767	Teacher, college and university teacher of non-engineering and non-science subjects (Engineering and science teachers, see codes 701—745.)
	Administrators, Managers, and Officials, excluding farm
768	Administrator or manager, production and operations
769	Administrator or manager, scientific and technical research and development
770	Administrator, manager, or official, all others, excluding self-employed
771	College president or dean
772	Self-employed proprietor
773	Urban and regional planners
	All other occupations
774	Accountant, except financial analyst
775	Administrative support occupations, including clerical work (such as bookkeeper, secretary, etc.)
776	Architect
777	Clergy
778	Farmer (owner, manager, tenant, or farm laborer)
779	Financial analyst
780	Firefighter or police
781	Historian
782	Laborer, except farm
783	Lawyer or judge
784	Librarian
785	Merchant or shopkeeper, self-employed
786	Operator or fabricator (such as assembler, welder, truck driver, etc.)
787	Postal worker
788	Precision production, craft, and repair occupations (such as carpenter, electrician, mechanic, repair worker, etc.)
789	Sales occupations, excluding sales engineer
790	Social worker
791	Surveyor
792	Other occupations, not specified above *(Describe briefly in the applicable item on questionnaire.)*

☆U.S. GOVERNMENT PRINTING OFFICE:1986—[illegible]

earned doctorates awarded in the united states (doctorates records file)

purpose and background

The Survey of Earned Doctorates collects information annually on the number and characteristics of recipients of doctorates awarded by the U.S. educational system. Results from this survey are used to construct the Doctorate Records File (DRF) which is virtually a complete listing of the 818,000 recipients of doctorates awarded by U.S. universities since 1920. The file includes research doctorates in all fields, but excludes professional (clinical) degrees such as the M.D. or the D.V.M. Doctorates play a key role in research and higher education. The survey and the DRF are designed to provide data of use to policy analysts and educational and labor force planners within the Federal Government, the general educational community, and other employment sectors.

survey instrument

The survey collects three major categories of data: sociodemographic characteristics, education, and postgraduation plans. Sociodemographic characteristics include items such as date and place of birth, sex, marital status, number of dependents, citizenship, race, Hispanic heritage, presence of physical handicap, and educational attainment of parents. Educational information includes State and year of high school graduation, dates and names of colleges attended, fields of study and degrees, title of dissertation and field, and kind and sources of financial support during graduate study. Postgraduation plans cover the current status of plans for further education or employment. If postdoctoral study is anticipated, the reason, field of study, organization, and primary source of support are requested. If employment is anticipated, the type of employer, work activity, field, and organization are requested.

survey design

The Survey of Earned Doctorates questionnaire is distributed, with the cooperation of deans of graduate schools, to all new recipients of a Ph.D. or equivalent degree (e.g., Ed.D.). The survey response rate has been about 95 percent. Limited entries are constructed for nonrespondents based on information collected from commencement programs, graduation lists, and other similar public records.

data availability

Most of the items on the current survey instrument have been collected since 1957. Race/ethnic data were first collected in 1973, and data on physical handicap were first collected in 1985. The field classification used for field of degree is consistent with that used in the *Classification of Instructional Programs* issued by the Center for Education Statistics/Department of Education.

Entries to the Doctorate Records File for 1920-57 were developed from commencement programs and similar sources; the data are generally limited to degrees held, date of degree receipt, and the institutions granting them. About 133,000 doctorates were awarded during that period.

data access

Information from the Doctorate Records File is covered by the provision of the Privacy Act and is available only in the form of statistical summaries or in a form which does not permit identification of any particular person. Time-series data from 1960 to the most recent survey year are available on diskette suitable for use on an IBM-compatible microprocessor. Inquiries regarding this survey should be addressed to:

Mr. Felix H. Lindsay
Division of Science Resources
Studies
Science and Engineering
Education Sector
Studies Group
National Science Foundation
1800 G Street, N.W., Room L611
Washington, D.C. 20550
(202) 634-4787

Summary data from each survey since 1967 are available in a series of annual publications, *Summary Report—Doctorate Recipients From U.S. Universities*, issued by the National Academy of Sciences, Office of Scientific and Engineering Personnel. Specialized data tabulations are available from the contractor. Information on data availability and costs may be obtained from:

Ms. Susan L. Coyle
Office of Scientific and
Engineering Personnel
National Academy of Sciences
2101 Constitution Avenue, N.W.
Washington, D.C. 20418
(202) 334-3161

[redacted]

Form Approved
OMB No. 3145-0019
Approval Expires 1/87

Conducted by
The Office of Scientific and Engineering Personnel of the National Research Council
In Cooperation with
The American Council of Learned Societies,
The Social Science Research Council,
The Council of Graduate Schools in the United States,
and Other Graduate Deans

Supported by
The National Science Foundation,
The Department of Education,
The National Endowment for the Humanities, and
The National Institutes of Health

To the Doctoral Candidate:

This is a brief description of the Survey of Earned Doctorates indicating how the resulting data are used and how the individual confidentiality of data is protected. The basic purpose of this survey is to gather objective data about doctoral graduates, data that are important in improving graduate education both at your home institution and at a national level. Often, decisions by federal, state, and private agencies to develop new programs or support present ones are based in part on the data developed by this survey. We ask your cooperation with the project. Your response is entirely voluntary and your failure to provide some or all of the information will in no way affect you.

The information requested on the accompanying questionnaire is largely self-explanatory. Please complete it, detach it along the perforated line, and return it to your Graduate Dean. On the back of this sheet is a Specialties List with code numbers and titles for classifying your fields of specialization. This will be useful in connection with several items on the questionnaire. If none of the detailed fields listed seems to be appropriate, note the "General" and "Other" categories.

What is the Survey of Earned Doctorates?

The survey form is distributed annually with the cooperation of the Graduate Deans and filled out by all graduates who have completed requirements for their doctoral degrees. Research doctorates in all fields are included, but professional degrees such as the MD, DDS, and DVM are not included because information about recipients of those degrees is compiled elsewhere. The cumulative file goes back to 1920 and is called the Doctorate Records File.

The use of the doctoral data has been increasing, partly because of the implications for graduate education stemming from the change in the growth pattern of the number of persons receiving doctorates (562 in 1920; 3,278 in 1940; 9,733 in 1960; 29,498 in 1970; peaking at 33,755 in 1973; and now at 31,253 in 1984). This survey attempts to supply some of the information as of the time the doctorate is received.

What uses are made of the Survey data?

The data collected by this survey questionnaire become part of the Doctorate Records File maintained by the Office of Scientific and Engineering Personnel of the National Research Council. In addition, all data collected will be provided to the National Science Foundation, the National Endowment for the Humanities, the National Institutes of Health, and the Department of Education. The Survey data are collected with the intention that they will be put to use, but only under carefully defined conditions. Such data as the number of degrees awarded in each field of specialization, the educational preparation of degree recipients, their sources of financial support, the length of time required to attain the degree, and postdoctoral employment plans of doctorate recipients are of great interest to graduate schools, employers, the scholarly community, and the nation generally. The Doctorate Records File is used for a limited number of carefully defined follow-up research studies. Each year a sample of doctorate recipients is selected for inclusion in a longitudinal research file maintained for the National Science Foundation, the National Institutes of Health, and the National Endowment for the Humanities. It is anticipated that in the future, as in the past, participation in the follow-up studies will be voluntary.

Statistical summaries from the Doctorate Records File are used by educational institutions, professional societies, and government agencies. Some specific examples are:

- An extensive statistical summary of the data is published and distributed to all graduate schools about every five years.(1) These reports have been widely used by graduate schools and states to evaluate their progress in providing doctoral education. The data may also be useful to graduate students as an aid in selecting a graduate department.
- Annual reports containing statistical summaries based on the most recent year's Survey are distributed to graduate schools, government agencies, and any others on request.(2)

The confidentiality of Survey data is carefully protected.

This information is solicited under the authority of the National Science Foundation act of 1950, as amended in P.L. 507 (42 U.S.C. 1862) Section 3(a)(6), and Executive Order 10521 (March 17, 1954). Within the extent provided by law, all information you provide will be treated as confidential, will be safeguarded in accordance with the provisions of the Privacy Act of 1974, and will be used for statistical purposes only. Information will be released only in the form of statistical summaries or in a form which does not identify information about any particular person. There are only two exceptions to this policy: (1) information (name, year, and field of degree) is released to institutions from which you received degrees and to other organizations as part of the address search procedure for follow-up research studies; and (2) information from your form will be made available to the institution where you receive your doctoral degree and to the National Science Foundation, the National Endowment for the Humanities, the National Institutes of Health, and the Department of Education.

(1) National Academy of Sciences, *A Century of Doctorates — Data Analyses of Growth and Change,* Washington, D.C. 1978.

(2) National Academy of Sciences, *Summary Report 1983; Doctorate Recipients from United States Universities,* Washington, D.C. 1984.

Instructions: The following field listing is to be used in responding to items 13, 14, 21b, and 22c. If a field marked with an asterisk (*) is chosen in item 13 or 14, please write in your field of specialization in the space provided.

AGRICULTURE

000 Agricultural Economics

005 Animal Breeding & Genetics
010 Animal Nutrition
019 Animal Sciences, Other*

020 Agronomy
025 Plant Breeding & Genetics
030 Plant Path. (See also 120)
039 Plant Sciences, Other*

040 Food Sciences
045 Soil Sciences
050 Horticulture Science
055 Fisheries Sciences
060 Wildlife Management
065 Forestry Science

098 Agriculture, General
099 Agriculture, Other*

BIOLOGICAL SCIENCES

100 Biochemistry
105 Biophysics

110 Bacteriology
115 Plant Genetics
120 Plant Path. (See also 030)
125 Plant Physiology
129 Botany, Other*

130 Anatomy
133 Biometrics & Biostatistics
136 Cell Biology
139 Ecology
142 Embryology
145 Endocrinology
148 Entomology
151 Immunology
154 Molecular Biology
157 Microbiology
160 Neurosciences
163 Nutritional Sciences
166 Parasitology
169 Toxicology
170 Genetics, Human & Animal
175 Pathology, Human & Animal
180 Pharmacology, Human & Animal
185 Physiology, Human & Animal
189 Zoology, Other*

198 Biological Sciences, General
199 Biological Sciences, Other*

HEALTH SCIENCES

200 Audiology & Speech Pathology
210 Environmental Health
215 Public Health
220 Epidemiology
230 Nursing
240 Pharmacy
250 Veterinary Medicine
298 Health Sciences, General
299 Health Sciences, Other*

ENGINEERING

300 Aerospace, Aeronautical & Astronautical
303 Agricultural
306 Bioengineering & Biomedical
309 Ceramic
312 Chemical
315 Civil
318 Communications
321 Computer
324 Electrical, Electronics
327 Engineering Mechanics
330 Engineering Physics
333 Engineering Science
336 Environmental Health Engin.
339 Industrial
342 Materials Science
345 Mechanical
348 Metallurgical
351 Mining & Mineral
354 Naval Arch. & Marine Engin.
357 Nuclear
360 Ocean
363 Operations Research (See also 465, 930)
366 Petroleum
369 Polymer
372 Systems
398 Engineering, General
399 Engineering, Other*

COMPUTER AND INFORMATION SCIENCES

400 Computer Sciences*
410 Information Sci. & Systems*

MATHEMATICS

420 Applied Mathematics
425 Algebra
430 Analysis & Functional Anal.
435 Geometry
440 Logic (See also 785)
445 Number Theory
450 Probability & Math. Statistics (See also 690)
455 Topology
460 Computing Theory & Practice
465 Operations Research (See also 363, 930)
498 Mathematics, General
499 Mathematics, Other*

PHYSICAL SCIENCES

Astronomy

500 Astronomy
505 Astrophysics

Atmospheric & Meteorological Sciences

510 Atmospheric Physics & Chem.
512 Atmospheric Dynamics
514 Meteorology
518 Atmos. & Meteorol. Sci., Gen.
519 Atmos. & Meteorol. Sci., Other*

Chemistry

520 Analytical
522 Inorganic
524 Nuclear
526 Organic
528 Pharmaceutical
530 Physical
532 Polymer
534 Theoretical
538 Chemistry, General
539 Chemistry, Other*

Geological Sciences

540 Geology
542 Geochemistry
544 Geophysics & Seismology
546 Paleontology
548 Mineralogy, Petrology
550 Stratigraphy, Sedimentation
552 Geomorphology & Glacial Geology
554 Applied Geology
558 Geological Sciences, General
559 Geological Sciences, Other*

Physics

560 Acoustics
561 Atomic & Molecular
562 Electron
564 Elementary Particle
566 Fluids
568 Nuclear
569 Optics
570 Plasma
572 Polymer
574 Solid State
578 Physics, General
579 Physics, Other*

Other Physical Sciences

580 Environmental Sciences
585 Hydrology & Water Resources
590 Oceanography
595 Marine Sciences
599 Physical Sciences, Other*

PSYCHOLOGY

600 Clinical
603 Cognitive
606 Comparative
609 Counseling
612 Developmental
615 Experimental
618 Educational (See also 822)
621 Industrial & Organizational (See also 935)
624 Personality
627 Physiological
630 Psychometrics
633 Quantitative
636 School (See also 825)
639 Social
648 Psychology, General
649 Psychology, Other*

SOCIAL SCIENCES

650 Anthropology
652 Area Studies
658 Criminology
662 Demography
666 Economics
668 Econometrics
670 Geography
674 International Relations
678 Political Sci. & Government
682 Public Policy Studies
686 Sociology
690 Statistics (See also 450)
694 Urban Studies
698 Social Sciences, General
699 Social Sciences, Other*

HUMANITIES

History

700 History, American
705 History, European
710 History of Science
718 History, General
719 History, Other*

Letters

720 Classics
723 Comparative Literature
729 Linguistics
732 Literature, American
733 Literature, English
734 English Language
736 Speech & Debate
738 Letters, General
739 Letters, Other*

Foreign Languages and Literature

740 French
743 German
746 Italian
749 Spanish
752 Russian
755 Slavic (other than Russian)
758 Chinese
762 Japanese
765 Hebrew
768 Arabic
769 Other Languages*

Other Humanities

770 American Studies
773 Archeology
776 Art History & Criticism
780 Music
785 Philosophy (See also 440)
790 Religion (See also 984)
795 Theatre
798 Humanities, General
799 Humanities, Other*

EDUCATION

800 Curriculum & Instruction
805 Educ. Admin. & Superv.
810 Educational Media
815 Educ. Stat. & Research
820 Educ. Testing, Eval. & Meas.
822 Educational Psychology (See also 618)
825 School Psych. (See also 636)
830 Social Foundations
835 Special Education
840 Student Counseling & Personnel Services
845 Higher Education

Teacher Education

850 Pre-elementary
852 Elementary
854 Junior High
856 Secondary
858 Adult & Continuing

Teaching Fields

860 Agricultural Educ.
861 Art Educ.
862 Business Educ.
864 English Educ.
866 Foreign Languages Educ.
868 Health Educ.
870 Home Economics Educ.
872 Industrial Arts Educ.
874 Mathematics Educ.
876 Music Educ.
878 Nursing Educ.
880 Physical Educ.
882 Reading Educ.
884 Science Educ.
885 Social Science Educ.
886 Speech Educ.
888 Trade & Industrial Educ.
889 Teacher & Educ. Specific Subject Areas, Other*

898 Education, General
899 Education, Other*

PROFESSIONAL FIELDS

Business & Management

900 Accounting
905 Banking & Finance
910 Business Admin. & Management
915 Business Economics
920 Marketing Mngmnt. & Research
925 Business Statistics
930 Operations Research (See also 363, 465)
935 Organiz. Beh. (See also 621)
938 Business & Mngmnt., General
939 Business & Mngmnt., Other*

Communications

940 Communications Research
945 Journalism
950 Radio & Television
958 Communications, General
959 Communications, Other*

Other Professional Fields

960 Architec. & Environ. Design
964 Home Economics
968 Law
972 Library & Archival Science
976 Public Administration
980 Social Work
984 Theology (See also 790)
988 Professional Fields, General
989 Professional Fields, Other*

999 OTHER FIELDS*

Form Approved
OMB No. 3145-0019
Approval Expires 1/87

SURVEY OF EARNED DOCTORATES, 1985-86

This form is to be returned to the GRADUATE DEAN, for forwarding to ....

The Office of Scientific and Engineering Personnel
National Research Council
2101 Constitution Avenue, Washington, D.C. 20418

Please print or type.

1. Name in full: ______________________________
Last Name *First Name* *Middle Name*

Cross Reference: Maiden name or former name legally changed ______________________________

2. Permanent address through which you could always be reached: (Care of, if applicable) ______________________________

____
Number *Street* *City*

____
State *Zip Code* *Or Country if not U.S.*

3. U.S. Social Security Number: _ _ _ — _ _ — _ _ _ _

4. Date of birth: ______________________________ Place of birth: ______________________________
(10-14) *Month* *Day* *Year* (15-16) *State* *Or Country if not U.S.*

5. Sex: 1 ☐ Male 2 ☐ Female (17)

6. Marital status: 1 ☐ Married
2 ☐ Not married (including widowed, divorced) (18)

7. Citizenship:
0 ☐ U.S. native
1 ☐ U.S. naturalized
2 ☐ Non-U.S., Immigrant (Permanent Resident)
____
(country of present citizenship)
3 ☐ Non-U.S., Non-Immigrant (Temporary Resident) (19-21)
____
(country of present citizenship)

8. Are you physically handicapped? ☐ Yes ☐ No
If yes, is it: 1 ☐ Visual 2 ☐ Orthopedic
3 ☐ Auditory 4 ☐ Vocal
5 ☐ Other (Specify) ______________________________ (80)

9. What is your racial background? (Check only one)
0 ☐ American Indian or Alaskan Native
1 ☐ Asian or Pacific Islander
2 ☐ Black
3 ☐ White (22)

10a. Is your ethnic heritage Hispanic? ☐ Yes ☐ No (23)

10b. If yes, is it: 0 ☐ Mexican American
1 ☐ Puerto Rican
2 ☐ Other Hispanic (24)

11. Number of dependents: ________ Do not include yourself. (Dependent = someone receiving at least one half of his or her support from you) (25)

EDUCATION

12. Location of high school last attended: ______________________________ (26-27)
State *Or Country if not U.S.*

Year of graduation from high school: ______________________________ (28-29)

13. List in the table below all collegiate and graduate institutions you have attended including 2-year colleges and each degree earned. List chronologically, and include your doctoral institution as the last entry.

		Years Attended		Major Field		Degree (if any)		
				Use Specialties List		Title of Degree	Granted	
Institution Name	Location	From	To	Name	Number		Mo.	Yr.

14. Enter below the title of your doctoral dissertation and the most appropriate classification number and field. If a project report or a musical or literary composition (not a dissertation) is a degree requirement, please check box. ☐ (12)

Title ______________________________

Classify using Specialties List

______________________________ Number Name of field

______________________________ ______________ ______________________________

15. Name the department (or interdisciplinary committee, center, institute, etc.) and school or college of the university which supervised your doctoral program: ______________________________
Department/Institute/Committee/Program *School*

16. Name of your adviser for dissertation, project report or music/literary composition: ______________________________
Last Name *First Name* *Middle Initial*

continued on next page

17. Please enter a "1" beside your primary source of support during graduate study. Enter a "2" beside your secondary source of support during graduate study. **Check** (✓) all other sources from which support was received. (Enter only **one** source as "1" and **one** source as "2")

Own/Family Resources
- a ___ Own Earnings
- b ___ Spouse's Earnings
- c ___ Family Contributions

University-Related
- d ___ Teaching Assistantship
- e ___ Research Assistantship
- f ___ University Fellowship
- g ___ College Work-Study
- h ___ Other ________________ *Specify*

Federal Support
- i ___ NIH Traineeship
- j ___ ADAMHA Traineeship
- k ___ ADAMHA Fellowship
- l ___ Other HHS
- m ___ NSF Fellowship
- n ___ Title VI Foreign Language and Area Studies Fellowship
- o ___ Graduate & Professional Opportunities Pgm. Fellowship (G*POP)
- p ___ Other Dept of Ed
- q ___ Veterans Administration (G.I. Bill, etc.)
- r ___ Other Federal ________________ *Specify*

U.S. Nationally Competitive Fellowships (Non-Federal)
- s ___ Ford Foundation
- t ___ Rockefeller Foundation
- u ___ Other Fellowship ________________ *Specify*

Student Loans
- v ___ Guaranteed Student Loan
- w ___ National Direct Student Loan
- x ___ Other Loan ________________ *Specify*

Other Sources
- y ___ Business/Employer Funds
- z ___ Other ________________ *Specify* (26-40)

18a. Please check the category which most fully describes your status during the year immediately preceding the award of the doctorate.
- 0 ☐ Full-time employed (Go to Item "18b")
- 1 ☐ Held fellowship
- 2 ☐ Held assistantship
- 3 ☐ Part-time employed
- 4 ☐ Not employed
- 5 ☐ Other (specify) ________________

18b. If full-time employed, what type of position did you hold?
- 6 ☐ College or university, faculty
- 7 ☐ College or university, non-faculty
- 8 ☐ Elem. or sec. school, teaching
- 9 ☐ Elem. or sec. school, non-teaching
- (11) ☐ Industry or business
- (12) ☐ Other (specify) ________________

(50)

POSTGRADUATION PLANS

19. What is the status of your current postgraduate plans?
- 0 ☐ Am returning to, or continuing in, predoctoral employment
- 1 ☐ Have signed contract or made definite commitment
- 2 ☐ Am negotiating with one or more specific organizations
- 3 ☐ Am seeking position but have no specific prospects
- 4 ☐ Other (specify) ________________ (51)

20. What best describes your immediate postgraduate plans?
- 0 ☐ Postdoctoral fellowship
- 1 ☐ Postdoctoral research associateship
- 2 ☐ Traineeship
- 3 ☐ Other study (specify) ________________

Go to Item "21"

- 4 ☐ Employment (other than 0,1,2,3)
- 5 ☐ Military service
- 6 ☐ Other (specify) ________________ (52)

Go to Item "22"

21. If you plan to have a postdoctoral fellowship, associateship, traineeship, or otherwise undertake further study

A. What was the **most** important reason for taking a postdoctoral appointment? (Check only one.)
- 0 ☐ To obtain additional research experience in my doctoral field
- 1 ☐ To work with a particular scientist or research group
- 2 ☐ To switch into a different field of research
- 3 ☐ Could not obtain the desired type of employment position
- 4 ☐ Other reason (specify) ________________ (53)

B. What will be the field of your postdoctoral study? Please enter number from Specialties List ________ (54-56)

C. What will be the primary source of research support?
- 0 ☐ U.S. Government
- 1 ☐ College or university
- 2 ☐ Private foundation
- 3 ☐ Nonprofit, other than private foundation
- 4 ☐ Other (specify) ________________
- 6 ☐ Unknown (57)

Go to Item "23"

22. If you plan to be employed, enter military service, or other—

A. What will be the type of employer?
- a ☐ U.S. 4-year college or university other than medical school
- b ☐ Foreign university
- c ☐ Medical school
- d ☐ Jr. or community college
- e ☐ Elem. or sec. school
- f ☐ Foreign government
- g ☐ U.S. Federal government
- h ☐ U.S. state government
- i ☐ U.S. local government
- j ☐ Nonprofit organization
- k ☐ Industry or business
- l ☐ Self-employed
- m ☐ Other (specify) ________________ (58)

B. Indicate what your **primary** work activity will be with "1" in appropriate box; **secondary** work activity (if any) with "2" in appropriate box.
- 0 ☐ Research and development
- 1 ☐ Teaching
- 2 ☐ Administration
- 3 ☐ Professional services to individuals
- 5 ☐ Other (specify) ________________ (59-60)

C. In what field will you be working? Please enter number from Specialties List ________________ (61-63)

D. Did you seriously consider undertaking postdoctoral study? Yes ______ No ______ (64)

If yes, why did you decide against the postdoctoral?
- 0 ☐ No postdoctoral appointment available
- 1 ☐ Felt that I would derive little or no benefit from a postdoctoral appointment
- 2 ☐ Postdoctoral available but stipend inadequate
- 3 ☐ Had more attractive employment opportunity
- 4 ☐ Other (specify) ________________ (65)

Go to Item "23"

23. What is the name and address of the organization with which you will be associated?

________________ *Name of Organization*

________________ *Street* *City, State* *Or Country if not U.S.* (66-71)

BACKGROUND INFORMATION

24. Please indicate, by circling the highest grade attained, the education of

your father:	none	1 2 3	4 5 6	7 8	9 10 11	12	1 2 3	4	MA, MD	PhD	Postdoctoral	(72)
		Elementary School			High School		College		Graduate			
your mother:	none	1 2 3	4 5 6	7 8	9 10 11	12	1 2 3	4	MA, MD	PhD	Postdoctoral	(73)
	0	1	2	3	4	5	6	7	8	9	(11)	

Signature ________________ Date ________________ (74-78)

If you would like to receive a summary of the results of this survey, please check box. ☐ (79)

characteristics of doctoral scientists and engineers (survey of doctorate recipients)

purpose and background

The objective of this survey, conducted biennially since 1973, is to provide national estimates of the supply and utilization of science and engineering (S/E) doctorates. These data are used for a number of policy studies to illuminate science and technology issues. The survey is one of three covering various S/E subpopulations that comprise the Scientific and Technical Personnel Data System (STPDS). The STPDS is designed to measure the employment and demographic characteristics of the Nation's S/E population.

survey instrument

Data are collected for major demographic and employment-related variables. Demographic variables include age, citizenship, marital status, sex, race, and Hispanic heritage. Employment-related variables include employment status (employed, unemployed, full/part-time employment, etc.), sector of employment, primary work activity, and salary. Information is also collected on reasons for working in a non-S/E job, if applicable.

sample design

The survey is based on a sample of individuals drawn from the Doctorate Records File, a census of doctorate-holders. Each survey population includes individuals who received doctorates during the preceding 42-year period. For example, the 1973 survey population earned their degrees between 1930 and 1972. Subsequent survey samples were constructed by adding the two most recent graduating cohorts and eliminating the two oldest.

The population includes individuals who earned a doctorate in the natural and social sciences, mathematics, and engineering from U.S. institutions, as well as individuals who received research doctorates in non-S/E fields but were known to be employed as scientists or engineers.

The sample is stratified according to the following characteristics: (1) source and type of degree (U.S. S/E doctorates and non-S/E doctorates); (2) sex; (3) field of doctorate; (4) year of doctorate; (5) racial/ethnic identification; and (6) citizenship.

A sample of approximately 57,000 was selected for the 1985 survey. The response rate was about 71 percent.

data availability

The 1985 Survey of Doctorate Recipients was the seventh in a biennial series which was initiated in 1973. Over the course of this survey, changes have been made to the survey instrument and taxonomies. In the construction of time-series, NSF adjusts prior data in order to take account of survey changes which would affect the consistency of data over time. Caution should be exercised in using previously published data to generate specialized time-series.

data access

Summary statistical tables will be available on diskettes prepared for use on an IBM-compatible microprocessor. Inquiries regarding this survey should be addressed to:

Mr. John A. Scopino
Division of Science Resources Studies
Scientific and Technical Personnel Characteristics Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L611
Washington, D.C. 20550
(202) 634-4664

Data in the form of special tabulations and machine readable tapes are available subject to the limitations of the Privacy Act and costs. Information on the availability of special data tabulations and costs may be obtained from:

Ms. Mary Belisle
Office of Scientific and Engineering Personnel
National Academy of Sciences
2101 Constitution Avenue, N.W.
Washington, D.C. 20418
(202) 334-3152

OMB No. 3145-0020

1985 SURVEY OF DOCTORATE RECIPIENTS

CONDUCTED BY THE NATIONAL RESEARCH COUNCIL WITH THE SUPPORT OF THE NATIONAL SCIENCE FOUNDATION, THE NATIONAL ENDOWMENT FOR THE HUMANITIES, THE NATIONAL INSTITUTES OF HEALTH, AND THE DEPARTMENT OF ENERGY

NOTE: THIS INFORMATION IS SOLICITED UNDER THE AUTHORITY OF THE NATIONAL SCIENCE FOUNDATION ACT OF 1950, AS AMENDED. ALL INFORMATION YOU PROVIDE WILL BE TREATED AS CONFIDENTIAL, WILL BE SAFEGUARDED IN ACCORDANCE WITH THE PROVISIONS OF THE PRIVACY ACT OF 1974, AND WILL BE USED FOR STATISTICAL PURPOSES ONLY. INFORMATION WILL BE RELEASED ONLY IN THE FORM OF STATISTICAL SUMMARIES OR IN A FORM WHICH DOES NOT IDENTIFY INFORMATION ABOUT ANY PARTICULAR PERSON. YOUR RESPONSE IS ENTIRELY VOLUNTARY AND YOUR FAILURE TO PROVIDE SOME OR ALL OF THE REQUESTED INFORMATION WILL IN NO WAY ADVERSELY AFFECT YOU.

If your name and address are incorrect, please enter correct information below.

____

____

______________________________ (10-11)

Please check the following information. If it is inaccurate or missing, please provide the correct information in the spaces provided.

1. Institution/Year of Doctorate ______________________________ (12-19)

2. Date of Birth ______________________________ (20-24)

3. Marital Status ______________________________ (25)

4a. What is your racial background?

1 ☐ American Indian or Alaskan Native
2 ☐ Asian or Pacific Islander
3 ☐ Black
4 ☐ White (26)

4b. Is your ethnic heritage Hispanic?

1 ☐ Yes
2 ☐ No
(27)

If YES, is it:
1 ☐ Mexican-American
2 ☐ Puerto Rican
3 ☐ Other Hispanic (28)

5. Do you have any children living with you who are:

Under 6 years of age? 1 ☐ Yes How many? ________ (30)
2 ☐ No
(29)

Between 6 and 18 years of age? 1 ☐ Yes How many? ________ (32)
2 ☐ No
(31)

6. Are you physically handicapped?

1 ☐ Yes 2 ☐ No (33)

If Yes, what is the nature of your handicap(s)? (Mark as many as apply)

1 ☐ Visual
2 ☐ Auditory
3 ☐ Ambulatory
4 ☐ Other, specify________ (34-37)

7. Citizenship

1 ☐ U.S. Native Born
2 ☐ U.S. Naturalized
3 ☐ Non-U.S., Immigrant (Perm. Res.)
4 ☐ Non-U.S., Non-Immigrant (Temp. Res.)
(38)

IF NON-U.S., specify country of citizenship

______________________________ (39-40)

8. Since receiving the doctorate, how many full-time equivalent years of professional work experience have you had? ________ **Years(s)** (41-42)

9. What was your employment status (includes postdoctoral appointment*) during February 1985? ☐ Circle your selection and enter number from below (43)

1. Employed full-time (Skip to #13)
2. Employed part-time
   If you were employed part-time, were you seeking full-time employment?
   A ☐ Yes B ☐ No (44)
3. Postdoctoral appointment*
   If you held a postdoctoral appointment, was it
   A ☐ Full-time (Skip to #13) B ☐ Part-time (45)
4. Unemployed and seeking employment (Skip to #11)
5. Not employed and not seeking employment (Skip to #12)
6. Retired and not employed (Skip to #28)
7. Other, specify

*Temporary appointment in academia, industry or government, the primary purpose of which is to provide for continued education or experience in research

10. **If you were employed part-time during FEBRUARY 1985, what was the MOST important reason for being in part-time status?**

☐ Enter number from below (46)

1. Part time employment preferred
2. Full time position not available
3. Constraints due to family or marital status
4. Other, specify ____________

(Skip to #13)

11. **If you were unemployed and seeking employment during February 1985, was your job search restricted by:**

☐ Enter number from below (47)

1. Geographic location
2. Family responsibilities
3. Need for part-time employment
4. Other, specify ____________
5. No restrictions (Skip to #28)

---

12. **If you were not employed and not seeking work during February 1985, what was the most important reason for not seeking work?**

☐ Enter number from below (48)

1. Temporarily absent for health or personal reasons
2. Tending to family responsibilities
3. Suitable job not available
4. Other, specify ____________

(Skip to #28)

13. **Please give the name of your principal employer (company, organization, postdoctoral institution, etc. or, if self employed, write "self") and actual place of employment during FEBRUARY 1985.**

____
Name of Employer (49-56)

____
City State ZIP (57-65)

---

14. **From the Employment Specialties List on page 4 select and enter both the number and title of the employment specialty most closely related to your principal employment or postdoctoral appointment during FEBRUARY 1985. Write in your specialty if it is not on the list.**

____
Number Title of Employment Specialty (66-68)

---

15. **Which category below best describes the type of your principal employment OR postdoctoral appointment during FEBRUARY 1985?**

☐ Enter number from below (69-70)

1. Business or industry (including self-employed)
2. Junior college, 2-year college, technical institute
3. Medical school (including university affiliated hospital or medical center)
4. 4 year college
5. University, other than medical school
6. Elementary or secondary school system
7. Private foundation
8. Hospital or clinic
9. U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA
10. U.S. government, civilian employee
11. State government
12. Local or other government, specify ____________
13. Nonprofit organization, other than those listed above
14. Other, specify ____________

---

16. **If you were employed during FEBRUARY 1985 in a speciality field other than your field of Ph.D., what was the MOST important reason for being in that position?**

☐ Enter number from below (71)

1. Better pay
2. More attractive career options
3. Preferred specific geographic location
4. Constraints due to family or marital status
5. Position in Ph.D. field not available
6. Promoted into new field
7. Other, specify ____________

17. **If your doctorate is in a humanities field and you were employed in a non-academic job in FEBRUARY 1985, what was the MOST important reason for your decision to enter the job?**

☐ Enter number from below (72)

1. Better pay
2. More attractive career options
3. Preferred specific geographic location
4. Constraints due to family or marital status
5. Academic position not available
6. Other, specify ____________

---

18. **If you were employed by an academic institution during FEBRUARY 1985,**

A. What was the rank of your position?

☐ Enter number from below (73)

FACULTY:
1. Professor
2. Associate professor
3. Assistant professor
4. Instructor
5. Administrator
6. Other, specify ____________ *Title*

NONFACULTY:
7. Teaching staff
8. Research staff
9. Other, specify ____________ *Title*

B. What was your tenure status?

1 ☐ Tenured, Year ____________ (75-76)
2 ☐ Not Tenured, in tenure-track position
3 ☐ Not Tenured, not in tenure-track position
(74)

19. What is your best estimate of the percentage of your professional work time that you devoted to each of the following activities during a typical week in your principal job? (Total should equal 100%)

%

1. ___ Teaching (10)
2. ___ Basic research (12)
3. ___ Applied research (14)
4. ___ Development of equipment, products, systems, data (16)
5. ___ Design (18)
6. ___ Writing, editing (20)
7. ___ Professional services to individuals (22)
8. ___ Management of R&D (24)
9. ___ Management of educational/other programs (26)
10. ___ Consulting (28)

%

11. ___ Operations – production, maintenance, construction, installation (30)
12. ___ Quality control, testing, evaluation (32)
13. ___ Sales, marketing, purchasing, estimating (34)
14. ___ Archival work (36)
15. ___ Curatorial work (38)
16. ___ Performing arts (40)
17. ___ Other, specify ______________________ (42)

TOTAL = 100%

a. **What were your primary and secondary work activities?** (Enter number 1-17 from question above) ☐ Primary (44-45) ☐ Secondary (46-47)

---

20. **What was the basic annual salary* associated with your principal professional employment during FEBRUARY 1985? If you were on a postdoctoral appointment (see question 9 for definition), what was your stipend plus allowances?**

$______________ per year (48-50)

Check whether salary was for ☐ 9-10 months or ☐ 11-12 months (51)

*Basic salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.

21a. **After receiving your doctorate, did you have to acquire formal training in any of the following areas in order to obtain your present position?**

1 ☐ Yes 2 ☐ No (52) **IF YES**, specify below

1. ___ Foreign languages
2. ___ Computer science
3. ___ Management and administration
4. ___ Survey research and statistics
5. ___ Other, specify ______________________ (53-57)

21b. **How long have you been in your present position?** _____ Year(s) (58-59)

22. **Was any of your work during FEBRUARY 1985 supported or sponsored by U.S. Government funds?**

1 ☐ Yes 2 ☐ No 3 ☐ Don't Know (60)

IF YES, which federal agencies or departments were supporting the work?

Enter number(s) from the list of Federal Supporting Agencies on page 4.

______________________ (61-72)

---

23. **Listed below are selected topics of national interest. If you devoted a significant proportion of your professional time to any of these problem areas during FEBRUARY 1985, please give the corresponding number of the ONE on which you spent the MOST time.** ☐ Enter number from below (73-74)

1. Energy or fuel
2. Health
3. Defense
4. Environ. protection, pollution control
5. Education (other than teaching)
6. Space
7. Crime prevention and control
8. Food and other agricultural products
9. Natural resources, other than fuel or food
10. Community development and services
11. Housing (planning, design, construction)
12. Transportation, communications
13. Cultural life
14. Other area, specify ______________________

If you [redacted] #23, please answer the following questions.
to #28.

24. **What percent of your professional time did you devote to energy or fuel activities during a typical week?** ________ percent (75-76)

---

25. **From the list below, give the corresponding number of the ONE energy source that involved the LARGEST proportion of your energy-related work during FEBRUARY 1985.** ☐ Enter number from below (77)

1. Coal and coal products
2. Petroleum (including oil shale and tar sands) or natural gas
3. Fission
4. Fusion
5. Hydroenergy
6. Direct solar (including space and water heating, thermal, electric)
7. Indirect solar (winds, tides, biomass, etc.)
8. Geothermal
9. Other, specify ______________________

---

26. **Please read the following list of energy-related activities and give the corresponding number(s) from the list below of the activity(ies) in which you were engaged during FEBRUARY 1985.** Enter number(s) from below ______________________ (10-29)

1. Exploration
2. Extraction (gas, oil, mining)
3. Manufacture of energy-related components or products
4. Fuel processing (including refining and enriching)
5. Electric power generation
6. Transportation, transmission, distribution of fuel or energy
7. Energy storage
8. Energy utilization, management
9. Fuel reprocessing or disposal
10. Energy conservation
11. Environmental impact (health, economic, etc.)
12. Education, training
13. Research and development
14. Other, specify ______________________

---

27. **Please enter the number 1-14 from question #26 that BEST describes the activity in which you spent MOST of your energy-related time** ☐ (30-31)

---

28. **Thank you for completing this questionnaire. Please return the completed form in the enclosed envelope to the National Research Council, JH630, 2101 Constitution Avenue, Washington, D.C. 20418.**

EMPLOYMENT SPECIALTIES LIST

MATHEMATICAL SCIENCES

000 - Algebra
010 - Analysis & Functional Analysis
020 - Geometry
030 - Logic (see also 834)
040 - Number Theory
052 - Probability
055 - Math. Statistics (see also 544, 670, 725, 727)
060 - Topology
082 - Operations Research (see also 478)
085 - Applied Mathematics
089 - Combinatorics & Finite Mathematics
098 - Mathematics, General
099 - Mathematics, Other*

COMPUTER AND INFORMATION SCIENCES

071 - Theory
072 - Software Systems
073 - Hardware Systems
074 - Intelligent Systems
079 - Computer Sciences, Other* (see also 437, 476)
081 - Information Sci. & Systems*

PHYSICS & ASTRONOMY

101 - Astronomy
102 - Astrophysics
110 - Atomic & Molecular
120 - Electromagnetism
132 - Acoustics
134 - Fluids
135 - Plasma
138 - Optics
140 - Elementary Particles
150 - Nuclear Structure
157 - Polymer
160 - Solid State
198 - Physics, General
199 - Physics, Other*

CHEMISTRY

200 - Analytical
210 - Inorganic
215 - Synthetic Inorganic & Organometallic
220 - Organic
225 - Synthetic Organic & Natural Products
230 - Nuclear
240 - Physical
250 - Theoretical
255 - Structural
260 - Agricultural & Food
270 - Pharmaceutical
275 - Polymer
280 - Biochemistry (see also 540)
298 - Chemistry, General
299 - Chemistry, Other*

EARTH, ENVIRONMENTAL, AND MARINE SCIENCES

301 - Mineralogy, Petrology
305 - Geochemistry
310 - Stratigraphy, Sedimentation
320 - Paleontology
330 - Structural Geology
341 - Geophysics (Solid Earth)
350 - Geomorph. & Glacial Geology
391 - Applied Geol., Geol. Engr. & Econ. Geol.
398 - Earth Sciences, General
399 - Earth Sciences, Other*
381 - Atmospheric Physics & Chemistry
382 - Atmospheric Dynamics
383 - Atmos. & Meteorol. Sci., Other*
388 - Environmental Sciences, General (see also 480, 528)
389 - Environmental Sciences, Other*
360 - Hydrology & Water Resources
370 - Oceanography
397 - Marine Sciences, Other*

ENGINEERING

400 - Aerospace, Aeronautical & Astronautical
410 - Agricultural
415 - Bioengineering & Biomedical
420 - Civil
430 - Chemical
435 - Ceramic
436 - Communications
437 - Computer
440 - Electrical
445 - Electronics
450 - Industrial & Manufacturing
455 - Nuclear
460 - Engineering Mechanics
465 - Engineering Physics
470 - Mechanical
475 - Metallurgical & Phys. Met. Engr.
476 - Systems Design & Systems Science (see also 072, 073, 074)
478 - Operations Research (see also 082)
479 - Fuel Technology & Petroleum
480 - Sanitary & Environmental Health
485 - Naval Arch. & Marine Engr.
486 - Mining & Mineral
487 - Ocean
490 - Polymer
497 - Materials Science & Engineering
498 - Engineering, General
499 - Engineering, Other*

AGRICULTURAL SCIENCES

501 - Agricultural Economics
508 - Animal Breeding & Genetics
509 - Animal Nutrition
512 - Animal Sciences, Other*
500 - Agronomy
511 - Plant Path. (see also 553)
513 - Plant Breeding & Genetics
514 - Plant Sciences, Other*
503 - Food Science and/or Technology (see also 573)
505 - Forestry
506 - Horticulture
507 - Soil Sciences
515 - Fisheries Sciences
516 - Wildlife Management
518 - Agriculture, General
519 - Agriculture, Other*

MEDICAL SCIENCES

520 - Medicine & Surgery
522 - Public Health & Epidemiology
523 - Veterinary Medicine
524 - Hospital Administration
526 - Nursing
527 - Parasitology
528 - Environmental Health
530 - Audiology & Speech Pathology
534 - Human and Animal Pathology
536 - Pharmacology
537 - Pharmacy
538 - Medical Sciences, General
539 - Medical Sciences, Other*

BIOLOGICAL SCIENCES

540 - Biochemistry (see also 280)
542 - Biophysics
550 - Botany
551 - Bacteriology
552 - Plant Genetics
553 - Plant Path. (see also 511)
557 - Plant Physiology
563 - Human & Animal Genetics
566 - Human & Animal Physiology
569 - Zoology
544 - Biometrics & Biostatistics (see also 055, 670, 725, 727)
545 - Anatomy
546 - Cell Biology
547 - Embryology
548 - Immunology
549 - Endocrinology
560 - Ecology
571 - Entomology
572 - Molecular Biology
573 - Food Science and/or Technology (see also 503)
574 - Behavior/Ethnology
575 - Microbiology
576 - Nutrition & Dietetics
589 - Neurosciences
590 - Toxicology
598 - Biological Sciences, General
599 - Biological Sciences, Other*

PSYCHOLOGY

600 - Clinical
603 - Cognitive
610 - Counseling & Guidance
620 - Developmental & Gerontological
630 - Educational
635 - School
641 - Experimental
642 - Comparative
643 - Physiological
650 - Industrial/Organizational
660 - Personality
670 - Psychometrics (see also 055, 544, 725, 727)
675 - Quantitative
680 - Social
698 - Psychology, General
699 - Psychology, Other*

SOCIAL SCIENCES

700 - Anthropology
703 - Archeology
706 - Communications
709 - Linguistics
710 - Sociology
720 - Economics (see also 501)
725 - Econometrics (see also 055, 544, 670, 727)
727 - Social Statistics (see also 055, 544, 670, 725)
730 - Demography
740 - Geography
745 - Area Studies*
751 - Political Sci. & Government
752 - Public Administration
753 - Public Policy Studies
755 - International Relations
760 - Criminology & Criminal Justice
770 - Urban & Regional Planning
775 - History & Philosophy of Sci.
798 - Social Sciences, General
799 - Social Sciences, Other*

HUMANITIES

804 - History, American
805 - History, European
806 - History, Other*

811 - American Literature
813 - English Language
814 - English Literature
827 - Classics
831 - Speech & Debate
836 - Comparative Literature
839 - Letters, Other*

821 - German
822 - Russian
823 - French
824 - Spanish & Portuguese
826 - Italian
829 - Other Languages*

802 - Art History & Criticism
808 - American Studies
809 - Theatre & Theatre Criticism
830 - Music
833 - Religious Studies (see also 881)
834 - Philosophy (see also 030)
891 - Library & Archival Sciences
878 - Humanities, General
879 - Humanities, Other*

EDUCATION AND PROFESSIONAL FIELDS

801 - Applied Art
881 - Theology (see also 833)
882 - Business & Management
883 - Home Economics
884 - Journalism
886 - Law, Jurisprudence
887 - Social Work
888 - Architec. & Environ. Design
896 - Professional Fields, General
897 - Professional Fields, Other*
938 - Education (other than teaching in a field listed above)

899 - OTHER FIELDS*

---

*Identify the specific field in the space on the questionnaire.

LIST OF FEDERAL SUPPORTING AGENCIES (For use with # 22)

1. Agency for International Development
2. Environmental Protection Agency
3. National Aeronautics & Space Administration
4. National Endowment for the Arts
5. National Endowment for the Humanities
6. National Science Foundation
7. Nuclear Regulatory Commission
8. Smithsonian Institution
9. Department of Agriculture
10. Department of Commerce
11. Department of Defense
12. Department of Energy
13. National Institutes of Health (DHHS)
14. Alcohol, Drug Abuse & Mental Health Administration (NIAA, NIDA, NIMH)
15. Other DHHS, specify ______________
16. Department of Education (NIE, OE, NCES)
17. Department of Housing and Urban Development
18. Department of the Interior
19. Department of Justice
20. Department of Labor
21. Department of State
22. Department of Transportation
23. Other agency or department, specify ________________
24. Don't know source agency

recent science and engineering graduates

purpose and background

The objective of this biennial survey, conducted since 1974, is to provide data on the demographic and employment characteristics of individuals who received bachelor's or master's degrees in science and engineering (S/E) fields from U.S. institutions. This survey is one of three covering varying S/E subpopulations that comprise the Scientific and Technical Personnel Data System (STPDS) which produces national estimates of the size and characteristics of the total stock of scientists and engineers in the United States. This survey provides updates to the S/E population estimates over the course of a decade to account for new entrants to supply.

survey instrument

Data are collected on major demographic and employment variables including graduate school enrollment. These variables include sex, race, Hispanic heritage, citizenship, marital status, and age. Additionally, information is collected on the early career experiences of these graduates, including such variables as labor force status, sector of employment, primary work activity, salary, and, if applicable, reasons for employment in a non-S/E job.

sample design

The survey population is limited to S/E degree recipients who were citizens or permanent residents of the United States. Recent surveys have been based on a two-stage probability sample. The primary sampling unit consists of universities and colleges. At this stage, the sample is stratified by geographic region, public/private institutional status, type of curriculum offered, and proportion of graduates with S/E majors. Special strata are also drawn which represent universities and colleges which have a predominately black student body, or have high concentrations of Hispanics.

The secondary sampling unit consists of graduates drawn from the sample of universities and colleges. Individuals drawn from institutions in the special strata are oversampled in order to increase the reliability of data on racial/ethnic groups.

The 1985 sample contained approximately 33,000 graduates. The survey population includes individuals receiving degrees in either of two periods: (a) the 1984 graduating class which received degrees between July 1, 1983 and June 30, 1984; and (b) the 1985 class which received degrees between July 1, 1984 and June 30, 1985. The response rate to the 1984 survey was 70 percent.

data availability

The first survey of recent S/E graduates was conducted in 1974 and included the graduating classes of 1971-73; subsequent surveys have been conducted in 1976, 1978, 1979, 1980, and 1982 which covered the respective classes graduating one to two years prior to the survey year.

Changes have occurred in both the survey instrument and reference lists over the course of this survey. As such, consistent data are only available for the 1982 and 1984 surveys.

data access

Data in the form of summary statistical tables are available on diskette prepared for use on an IBM-compatible microprocessor. Inquiries regarding this survey should be addressed to:

Ms. Melissa J. Lane
Division of Science Resources Studies
Scientific and Technical Personnel Characteristics Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L611
Washington, D.C. 20550
(202) 634-4664

Machine readable tapes are available for all survey years. The cost of data for individual survey years ranges between $60 and $80 per tape. The cost per year of multiple survey-year tapes is less. Inquiries should be addressed to:

Mr. Patrick Wenzel
Data Processing Library
University of Wisconsin at Madison
3308 Social Science Building
Madison, Wisconsin 53706
(608) 262-0750

INSTITUTE FOR SURVEY RESEARCH
TEMPLE UNIVERSITY
-Of The Commonwealth System Of Higher Education-
PHILADELPHIA, PENNSYLVANIA 19122

STUDY #518-305-01
SPRING/SUMMER 1986

OMB No.: 3145-0077
Expires: January 31, 1988

1986 SURVEY OF SCIENCE, SOCIAL SCIENCE, AND ENGINEERING GRADUATES

NATIONAL SCIENCE FOUNDATION
AND
U.S. DEPARTMENT OF ENERGY

This information is solicited under the authority of the National Science Foundation Act of 1950, as amended. All information you provide will be treated as confidential and will be used for statistical purposes only. Information will be released only in the form of statistical summaries from which it will be impossible to identify any particular person. Your response is entirely voluntary and failure to provide some or all of the requested information will not in any way adversely affect you.

NAME: ____________________

ADDRESS: ____________________

____

TELEPHONE: (   ) ____________________

(NOW PLEASE SKIP TO THE INSTRUCTIONS FOR COMPLETING THIS QUESTIONNAIRE ON PAGE 3.)

DEGREE AND EMPLOYMENT SPECIALTY LIST

Agriculture

803	Agricultural economics
804	Agriculture, business
013	Agronomy
014	Animal, dairy, poultry, sciences
015	Farm and range management
016	Fish, game and wildlife management
017	Food sciences
018	Forestry and related sciences
019	Horticulture
020	Natural resources management
021	Soil science
090	Agricultural sciences, other

Biological Sciences

211	Anatomy, histology
213	Biochemistry
714	Biometrics and biostatistics
214	Biophysics
215	Botany
221	Cell and molecular biology
216	Entomology
226	Embryology
217	Genetics
218	Immunology
219	Marine biology
220	Microbiology, bacteriology
227	Neurosciences
222	Nutrition
228	Parasitology
223	Pathology, human, animal, plant
224	Physiology, human, animal, plant
229	Radiology
230	Toxicology
225	Zoology
290	Biological sciences, other

Education

413	Biological sciences education
414	Engineering education
417	Mathematics education
421	Physical sciences education
425	Social science education
490	Education, other

Engineering

511	Aerospace, aeronautical, astronautical
512	Agricultural
513	Architectural
514	Bioengineering and biomedical engineering
515	Chemical, including petroleum refining
516	Civil, construction, and transportation
723	Computer
517	Electrical, electronic, and communication
529	Engineering science, mechanics, physics
519	Environmental and sanitary
520	Geological
521	Industrial
530	Materials
522	Mechanical
523	Metallurgical
524	Mining and mineral
525	Naval architecture and marine
526	Nuclear
531	Ocean
527	Petroleum
528	Textile
751	Operations research/management sciences
590	Engineering, other

Mathematical Sciences

711	Actuarial science
712	Applied mathematics
723	Computer sciences
750	Mathematics
751	Operations research/management sciences
713	Statistics
714	Biometrics and biostatistics
723	Computer and information sciences
780	Mathematics, other

Physical Sciences

720	Astronomy
721	Atmospheric sciences and meteorology
213	Biochemistry
722	Chemistry
741	Earth sciences and geology
733	Metallurgy
742	Oceanography
731	Physics
790	Physical sciences, other

Social Sciences

811	Anthropology
812	Criminology
813	Economics (except agricultural)
814	Geography
118	Linguistics
817	Political science and government
818	Psychology (except clinical)
821	Sociology
822	Urban studies
890	Other social sciences

Health Sciences

611	Clinical psychology
612	Dentistry
614	Hospital and health care administration
615	Medicine or pre-medicine
616	Nursing
617	Pharmacology
618	Pharmacy
690	Other health areas

Arts, Humanities and Other Specialties

910	Area and ethnic studies
911	Architecture and environmental design
110	Arts and letters, general
310	Business and commerce
115	English and journalism
114	Fine and applied arts
116	Foreign language and literature, all fields
815	History
912	Home economics, all fields
913	Law and prelaw
914	Library science
915	Military science, including merchant marine deck officer
816	Philosophy
819	Religion and theology
820	Social work
999	Other specialties

EMPLOYER CLASSIFICATION LIST

Code	
	Manufacturing
401	Primary metals products
402	Fabricated metals products
403	Computers and computing equipment
404	Nonelectrical machinery (including engines and turbines, construction machinery, metal working and industrial machinery; and excluding computing and computing equipment)
	Electrical Equipment
405	Household appliances (excluding radios and televisions)
406	Radios and televisions
407	Other electrical equipment (including electric motors, transmission equipment, and generators)
	Transportation Equipment
408	Aircraft, aircraft engines and parts
409	Motor vehicles and equipment
410	Guided missiles and space vehicles and parts
411	Other transportation equipment (including railroad and parts)
412	Ordinance (including arms manufacture and ammunition)
413	Professional and scientific instruments
414	Chemicals and allied products
415	Petroleum and coal products, including petroleum refining
416	Other manufacturing
417	Construction
	Mining and Petroleum Extraction
418	Coal mining
419	Petroleum and gas extraction
420	Other mining
	Transportation, Communication, and Utilities
421	Transportation
422	Communications
423	Utilities and sanitary services
	Wholesale and Retail Trade
424	Wholesale trade
425	Retail trade
426	Finance, Insurance, and Real Estate
	Services
427	Computer and data processing services
428	Engineering, architectural, and surveying services
429	Other services
430	Educational Institutions
431	Uniformed Military Service
	Government
432	Federal
433	State
434	Local
435	Other
436	Other

INSTRUCTIONS FOR COMPLETING THIS QUESTIONNAIRE

In constructing this questionnaire, we have tried to provide response categories for most answers. If the response categories are not adequate for you to answer a question correctly, please write your answer in the question box. If you are not certain of the correct response, please give us your best estimate or guess.

There is basically one type of question: closed-end questions, where response categories have been provided and you are asked to mark a box. In addition, in some of the questions you are asked to fill in "code numbers" either from the list on page 2, from the list above, or from a preceding question.

An example, with sample answers, is shown below.

1. Do you subscribe to any periodical journals or magazines?

1. ☒ Yes *(GO TO QUESTION 2)*
☐ No *(SKIP TO NEXT SECTION)*

2. Which of the following journals or magazines do you receive? *(MARK AS MANY AS APPLY)*

01. ☒ Newsweek
02. ☐ Time
03. ☐ Life
04. ☒ Science
05. ☒ Scientific American
06. ☒ Other, *Specify:* Science 86

3. Which of the journals marked in question 2 most relates to the kind of work you do? *(ENTER THE APPROPRIATE CODE NUMBER FROM QUESTION 2)*

0 4

Please answer all the questions that apply to you and follow directions which may ask you to skip certain questions. In the absence of instructions, always go to the next question. Even if you feel only part of the questionnaire applies to you, or there are some questions you cannot answer, please answer as many questions as possible and return the entire questionnaire.

We appreciate your participation and thank you for completing this questionnaire. Now please go to page 4 and answer all applicable questions.

PART I. DEMOGRAPHIC CHARACTERISTICS

1/8-11

1. In what month and year were you born?

______________ (MONTH) __________ (YEAR)

12-14

1a. Where was your place of birth?

____
(STATE, OR FOREIGN COUNTRY, IF NOT USA)

15

2. Are you:

1. ☐ Male 2. ☐ Female

16-18

3. Are you:

1. ☐ U.S. citizen
2. ☐ U.S. naturalized
(SKIP TO QUESTION 4)
3. ☐ Non-U.S. immigrant (Permanent Resident)
4. ☐ Non-U.S. citizen, nonimmigrant (Temporary Resident)

3a. If non-U.S. citizen, of which country are you a citizen?

____
(COUNTRY)

19

4. Are you:

1. ☐ American Indian or Alaskan Native
2. ☐ Asian or Pacific Islander
3. ☐ Black
4. ☐ White
5. ☐ Other, *please specify:* → ____________________

20

4a. Are you of Spanish/Hispanic origin or descent?

1. ☐ Yes → 2. ☐ Mexican-American
3. ☐ Puerto Rican
4. ☐ Other Hispanic
5. ☐ No

21

5. As of April 6, 1986, were you:

1. ☐ Married 2. ☐ Widowed
3. ☐ Separated 4. ☐ Divorced
5. ☐ Never married

22

6. As of April 6, 1986, did you have any children living with you?

1. ☐ Yes → 2. ☐ Under 6 years of age
3. ☐ 6-17 years of age
4. ☐ No

23-24

7. Are you physically handicapped?

1. ☐ Yes *(GO TO QUESTION 8)*
2. ☐ No *(SKIP TO QUESTION 9)*

8. What is the nature of your handicap(s)? *(MARK AS MANY AS APPLY)*

1. ☐ Visual 2. ☐ Ambulatory
4. ☐ Auditory 8. ☐ Other, *specify:* → ____________________

1/25

⑨ Between January 1986 and May 1986, did you attend a college or university?

1. ☐ Yes ➡ 2. ☐ Undergraduate, full-time
3. ☐ Undergraduate, part-time
4. ☐ Graduate, full-time
5. ☐ Graduate, part-time

} *(GO TO QUESTION 9a)*

6. ☐ No *(SKIP TO QUESTION 10)*

26-28

(9a.) What field of study did you pursue?
(ENTER CODE AND DESCRIPTION FROM LIST ON PAGE 2)

☐☐☐ (CODE) ____________________ (DESCRIPTION)

☐ Did not pursue any specific field of study

29-32

(10.) What was the highest level of education completed by both your mother and your father?
(MARK ONE FOR EACH)

	FATHER	MOTHER	
1.	☐	☐	None
			Elementary, grade
2.	☐	☐	1
3.	☐	☐	2
4.	☐	☐	3
5.	☐	☐	4
6.	☐	☐	5
7.	☐	☐	6
8.	☐	☐	7
9.	☐	☐	8
			High School, grade
10.	☐	☐	9
11.	☐	☐	10
12.	☐	☐	11
13.	☐	☐	12
			College, year
14.	☐	☐	1
15.	☐	☐	2
16.	☐	☐	3
17.	☐	☐	4
			Graduate, degree
18.	☐	☐	M.A., M.S.
19.	☐	☐	Professional degree (e.g., M.D., J.D.)
20.	☐	☐	Ph.D.
21.	☐	☐	Postdoctorate

PART II. EDUCATION

In the table below, list all undergraduate and graduate degrees, excluding honorary degrees, that have been awarded to you. Refer to the list on page 2 for the description and code number of major fields. Do NOT include correspondence courses, on-the-job training, apprenticeship, or training at an employer's training school.

If you need more space, attach a separate sheet of paper and give the same type of information for each additional school listed.

1/33
34-35

11a. TYPE OF DEGREE	11b. MONTH AND YEAR DEGREE GRANTED		11c. MAJOR FIELD *(ENTER DESCRIPTION AND CODE FROM LIST ON PAGE 2)*	
	MONTH	YEAR	DESCRIPTION	CODE
Bachelor's	36-39			40-42
Master's	43-46			47-49
Doctorate	50-53			54-56
Other *(SPECIFY):* ____________	57-60			61-63
Other *(SPECIFY):* ____________	64-67			68-70
Other *(SPECIFY):* ____________	71-74			75-77

2/8-9
10-11
12-13

PART III. EMPLOYMENT STATUS

2/14

(12.) During the week of April 6, 1986, were you:

1. ☐ Working full-time (35 hours or more at least in one position) *(SKIP TO QUESTION 16)*
2. ☐ Working part-time *(GO TO QUESTION 13)*
3. ☐ Not working, but seeking work *(SKIP TO QUESTION 15a)*
4. ☐ Not working and not seeking work *(SKIP TO QUESTION 14)*

15

(13.) Were you seeking full-time work?

1. ☐ Yes
2. ☐ No

(SKIP TO QUESTION 16)

16

(14.) Did you look for work at any time during the three weeks prior to the week of April 6, 1986; that is, between March 16 and April 5, 1986?

1. ☐ Yes 2. ☐ No

17-18

(15.) What was the main reason you were not working or not seeking work during the week of April 6, 1986?

(MARK ONLY ONE BOX)

1. ☐ On layoff from a job
2. ☐ On vacation or otherwise temporarily absent from a job for health or personal reasons

(GO TO QUESTION 16)

3. ☐ Retired
4. ☐ Student
5. ☐ Family responsibilities
6. ☐ Chronic illness or permanent disability
7. ☐ Could not find work or believed no jobs available in my particular field
8. ☐ Did not want to work
9. ☐ New job to begin within 30 days
10. ☐ Waiting for school to begin
11. ☐ Other, *please specify:*

____

____

____

(SKIP TO PART IV ON PAGE 8)

19

(15a.) If you were unemployed and seeking employment during the week of April 6, 1986, was your job search restricted by:

(MARK ONLY ONE BOX)

1. ☐ Geographic location
2. ☐ Family responsibilities
3. ☐ Need for part-time employment
4. ☐ Other, *please specify:*

____

____

5. ☐ Not restricted

(SKIP TO PART IV ON PAGE 8)

20

(16.) During the week of April 6, 1986, were you working at (or on layoff or temporarily absent from) a position related to the natural sciences, social sciences, or engineering?

1. ☐ Yes *(SKIP TO PART IV ON PAGE 8)*
2. ☐ No *(GO TO QUESTION 17)*

21-22

(17.) What was the most important reason that you were NOT working at a position related to science or engineering? *(MARK ONLY ONE BOX)*

1. ☐ Preferred nonscience or nonengineering position
2. ☐ Promoted out of science or engineering position
3. ☐ Pay was better in nonscience or nonengineering position
4. ☐ Locational preference
5. ☐ Science or engineering position not available
6. ☐ Other reason, *please specify:*

____

____

____

____

PART IV. EMPLOYMENT PROFILE

☐ *If you have never been employed, nor self-employed, please mark this box and SKIP TO QUESTION 38 ON PAGE 12. Otherwise, CONTINUE with the instructions below.*

In this part of the questionnaire, we are asking questions about the job you held during the week of April 6, 1986, or your most recent job before April 6th. Please include any employment, including a military service job, not only a scientific or technical job. If you had more than one regular job during the week of April 6th, please list the one which you consider your principal employment.

(18.) For whom did you work? What is the name of the company, business, or the government agency you worked for? 2/23

______________________________ *Check here if self-employed* ☐

(18a.) Where were you employed, that is, in what city, county, and state? 24-25

______________ (CITY OR TOWN)
______________ (COUNTY)
______________ (STATE OR FOREIGN COUNTRY)

(19.) How would you classify the organization for which you work? 26-28

(PLEASE ENTER CODE FROM EMPLOYER CLASSIFICATION LIST ON PAGE 3. IF THE ORGANIZATION CONDUCTS ITS ACTIVITIES AT DIFFERENT LOCATIONS, ENTER THE CODE FOR THE ACTIVITY AT THE LOCATION WHERE YOU ARE EMPLOYED. PLEASE WRITE IN THE TYPE OF ACTIVITY IF IT IS NOT FOUND ON THE LIST.)

☐ ☐ ☐ (CODE) TYPE OF ACTIVITY: ______________________________

(20.) Which of the categories below best describes the type of organization of your principal employment or post-doctoral appointment? *(MARK ONLY ONE BOX)* 29-30

01 ☐ Self-employed
02 ☐ Business or industry
03 ☐ Junior college, 2-year college, technical institute
04 ☐ Medical school
05 ☐ 4-year college or university, other than medical school
06 ☐ Elementary or secondary school system
07 ☐ Hospital or clinic
08 ☐ Nonprofit organization, other than hospital, clinic or educational institution
09 ☐ U.S. military service, active duty, or Commissioned Corps, such as USPHS, NOAA, etc.
10 ☐ U.S. Government, civilian employee
11 ☐ State government
12 ☐ Local or other government *(SPECIFY)*: ______________________________

13 ☐ International agency
14 ☐ Other *(SPECIFY)*: ______________________________

(21.) If you had more than one job during the week of April 6, 1986, enter the category from the above list that is most appropriate for your second job. 31-32

(ENTER THE APPROPRIATE CODE NUMBER, 01-14, FROM QUESTION 20 ABOVE)

☐ ☐ (CODE) ☐ Did not have a second job the week of April 6, 1986.

2/33-36

22. From the activities listed below, select your primary and secondary work activities for your principal job (as reported in question 18) in terms of time devoted for a typical week.

(ENTER THE APPROPRIATE CODE NUMBER 01-16 FOR EACH)

☐☐ Primary activity ☐☐ Secondary activity

01	Management or administration of research or development
02	Management or administration of other than research and development
03	Teaching and training - preparing and teaching courses, guiding and counseling students or trainees
04	Basic research - that is, study directed toward gaining scientific knowledge primarily for its own sake
05	Applied research - that is, study directed toward gaining scientific knowledge in an effort to meet a recognized need
06	Development - product, process, and technical development. That is, direction of knowledge gained from research toward production of useful materials, devices, systems and methods
07	Report and technical writing, editing, information retrieval
08	Clinical diagnosis, psychotherapy
09	Design of equipment, processes, models
10	Quality control, testing, evaluation, or inspection
11	Operations - production, maintenance, construction, installation, exploration
12	Distribution - sales, traffic, purchasing, customer and public relations
13	Statistical work - survey work, forecasting, statistical analysis
14	Consulting
15	Computer applications
16	Other activities *(SPECIFY)*: ____________________

37-45

23. During a typical week in your principal job (as reported in question 18), what percent of working time do you devote to the following activities?

(ENTRIES SHOULD TOTAL 100.0%)

____% Primary work activity

____% Secondary work activity

____% Other activities

100.0% TOTAL

46-48

24. From the Degree and Employment Specialty List on page 2, select and enter the number and title of the specialty most closely related to your principal employment (as reported in question 18) during the week of April 6, 1986.

(PLEASE WRITE IN YOUR SPECIALTY IF IT IS NOT ON THE LIST)

Number: ☐☐☐

Title: ____________________

2/49-53

(25.) For your principal job (as reported in question 18), what is the basic annual salary you currently earn?

(Do not include bonuses, overtime, summer teaching or other payments for secondary jobs.)

$____________________.00 per year

☐ Not currently employed at that job.

54

(26.) If academically employed in your principal job, is your salary for:

☐ 9-10 months, OR ☐ 11-12 months?

55-59

(27.) What was your total professional income in 1985, including basic annual salary, bonuses, overtime, summer teaching, consulting fees, etc.?

$____________________.00 per year

☐ None

60-64

(28.) What was your basic annual salary in 1985 from the principal job you held longest, excluding bonuses, overtime, summer teaching, consulting fees, etc.?

$____________________.00 per year

☐ None

65-66

(29.) How many years of professional work experience, including teaching, do you have?

________ Year(s) or ☐ None

67-69

(30.) Using the list on page 2, complete the following statement:

"Based on my total education and experience, I regard myself professionally as a(an) ...

________________________________."

CODE: ☐ ☐ ☐

70

(31.) During the week of April 6, 1986, was any of your work at your principal job supported by U.S. Government funds?

1. ☐ Yes ➡ *(GO TO QUESTION 32)*
2. ☐ No } *(SKIP TO QUESTION 33)*
3. ☐ Don't know }

3/8-24

(32.) Which of the following agencies or departments were supporting your work?

(MARK AS MANY AS APPLY)

1. ☐ AID--Agency for International Development
2. ☐ Department of Agriculture
3. ☐ Department of Commerce
4. ☐ Department of Defense
5. ☐ Department of Energy
6. ☐ Department of Education (NIE, OE, NCES)
7. ☐ Department of Health and Human Services (DHHS--old HEW)
8. ☐ Department of Housing and Urban Development (HUD)
9. ☐ Department of the Interior
10. ☐ Department of Justice
11. ☐ Department of Labor (DOL)
12. ☐ Department of Transportation
13. ☐ EPA--Environmental Protection Agency
14. ☐ NASA--National Aeronautics and Space Administration
15. ☐ NSF--National Science Foundation
16. ☐ Nuclear Regulatory Commission
17. ☐ Other, *specify:*

    ____

    ____

18. ☐ Don't know source agency

3/23-26

33. The following list contains selected areas of national interest. Indicate the one area to which you devote(d) the most professional time during a typical week at the job reported in question 18.

1. ☐ Energy and fuel *(GO TO QUESTION 34)*
2. ☐ Health
3. ☐ Environment
4. ☐ Education
5. ☐ National defense
6. ☐ Agriculture
7. ☐ Mineral resources
8. ☐ Community development and service
9. ☐ Housing (planning, design, construction)
10. ☐ Transportation
11. ☐ Communications
12. ☐ Technological development
13. ☐ Space
14. ☐ Other, *please specify:*

____

____

(SKIP TO QUESTION 38)

27

34. What is your best estimate of the percent of your professional time that you devote(d) to energy and fuel during a typical week?

1. ☐ 100 percent
2. ☐ 75 to 99 percent
3. ☐ 50 to 74 percent
4. ☐ 25 to 49 percent
5. ☐ 24 percent or less

28-29

35. From the list below, indicate the one energy source that involves(d) the largest proportion of your energy-related work during a typical week.

1. ☐ Coal and coal products
2. ☐ Petroleum (including oil shale and tar sands) or natural gas
3. ☐ Fission
4. ☐ Fusion
5. ☐ Hydroenergy
6. ☐ Direct solar (including space and water heating, thermal, electric)
7. ☐ Indirect solar (winds, tides, biomass, etc.)
8. ☐ Geothermal
9. ☐ Other, *specify:*

____

____

30-42

36. From the list of energy-related activities below, indicate the items that best describe the activities in which you were engaged during a typical week.

(MARK AS MANY AS APPLY)

1. ☐ Exploration
2. ☐ Extraction (gas, oil, mining)
3. ☐ Manufacture of energy-related components or products
4. ☐ Fuel processing (including refining and enriching)
5. ☐ Electric power generation
6. ☐ Transportation, transmission, distribution of fuel or energy
7. ☐ Energy storage
8. ☐ Energy utilization, management
9. ☐ Fuel reprocessing or disposal
10. ☐ Energy conservation
11. ☐ Environmental impact (health, economic, etc.)
12. ☐ Education, training
13. ☐ Other, *specify:*

____

____

43-44

37. From the list in question 36, enter the number of the activity that best describes the one in which you spend(t) most of your energy-related time.

(ENTER THE APPROPRIATE CODE NUMBER, 01-13, FROM QUESTION 36)

☐ ☐

(CODE)

(PLEASE TURN TO PAGE 12 AND COMPLETE THE REMAINING TWO QUESTIONS.)

PART V. OTHER INFORMATION

(38.) So that we can contact you in the event it is necessary to clarify some of the information you provide, please give the telephone number at which you can be reached.

______ (AREA CODE) ______ (NUMBER)

If there is an alternate number at which you can be reached, enter it also.

______ (AREA CODE) ______ (NUMBER)

(39.) Date completed: 3/45-50

______ (MONTH) ______ (DAY) ______ (YEAR)

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE. PLEASE RETURN THE COMPLETED FORM IN THE ENCLOSED POSTAGE-PAID ENVELOPE TO:

INSTITUTE FOR SURVEY RESEARCH
TEMPLE UNIVERSITY - 083-46
1601 NORTH BROAD STREET
PHILADELPHIA, PA 19122

graduate science and engineering students and postdoctorates (GSESP)

purpose and background

The purpose of this survey is to obtain data on the characteristics of graduate science and engineering (S/E) enrollment at the departmental level. It provides the only nationally representative data base on the characteristics and major sources of support of full-time graduate S/E students. The data compiled from this survey present a means for assessing the relationship between financial support patterns and resulting shifts in graduate enrollment and postdoctorates.

survey instrument

The survey primarily collects information on the headcounts of full-time graduate students, with information on sources and mechanisms of their major support (e.g., fellowships, traineeships, research assistantships, or teaching assistantships), sex, race, ethnic background, level of study (first year or beyond), and citizenship. For graduate students enrolled part time, summary data on sex and racial/ethnic background are available. Summary information on postdoctorates and nonfaculty research staff also cover source and mechanism of support, sex, and citizenship.

sample design

The survey population includes both doctorate- and master's-granting institutions, as well as medical schools and other specialized institutions offering first-professional doctorates in health-related fields. With the 1984 survey, the National Science Foundation (NSF) converted from a universe survey to a sample of 518 responding units at 401 institutions. All 325 doctorate-granting institutions, as well as 18 historically black universities and colleges with master's-level programs are surveyed with certainty. The remaining 275 master's-granting institutions form a probability sample, stratified on the basis of their total graduate S/E enrollment. Sample design was modified slightly in fall 1985 to improve field coverage. Response rates have exceeded 90 percent in recent years.

data availability

This survey has been conducted annually since 1972. Originally, the survey was limited to institutions granting a doctoral degree in at least one S/E field. Since 1972, the survey universe has been expanded: First, through the addition of all medical schools with graduate programs; second, with the inclusion of all S/E departments in master's-granting institutions; and third, with the annual addition of newly formed institutions and departments within the scope of the survey.

The expansion of coverage to master's-granting institutions was initiated as a parallel survey utilizing an abbreviated form in 1976. For comparison purposes, selected 1975 data variables were collected for these institutions at the same time. The expanded population of doctorate- and master's-granting institutions has been surveyed in parallel since 1977.

In 1978, as part of an NSF experiment with biennial reductions in survey scope to reduce respondent burden, the population was restricted to doctorate-granting institutions and an abbreviated survey instrument was employed. The full population was restored for the succeeding survey, with a revised full-scale survey form sent to both doctorate- and master's-granting institutions.

data access

Summary statistical tables presenting survey results are available on diskettes suitable for use on an IBM-compatible microprocessor. Inquiries regarding this survey should be addressed to:

Mr. J.G. Huckenpahler
Division of Science Resources
Studies
Science and Engineering
Education Sector Studies
Group
National Science Foundation
1800 G Street, N.W., Rm. L611
Washington, D.C. 20550
(202) 634-4787

A multiyear magnetic tape is generally made available containing data for the period covering 1977 through the most recent survey year. The most recent 1977-85 tape includes only those items which were included in the 1985 survey; it does not contain detail which were collected in prior years but have no counterpart in the current survey. A *Data User Guide* has been developed for the multiyear tapes documenting the compatible code structure utilized in NSF's four academic surveys. (See NSF contact listed previously.) Data for 1972, 1973, 1974, 1975 , and 1976 are available on single-year tapes. The user should be aware, however, that no attempt has been made to update these earlier tapes with subsequent data corrections received from participant institutions.

Information regarding data tape availability or contents should be addressed to:

Mr. George Nozicka
Quantum Research Corporation
7300 Pearl Street, Suite 210
Bethesda, Maryland 20814
(301) 657-3070

The cost of the multiyear tape is $325; each single-year tape costs $100.

INSTRUCTIONS FOR SURVEY OF GRADUATE SCIENCE AND ENGINEERING STUDENTS AND POSTDOCTORATES, FALL 1986

Purpose of the Survey

The Survey of Graduate Science and Engineering Students and Postdoctorates is conducted annually by the Science/Engineering Education Studies Group (SEESSG) of the National Science Foundation's Division of Science Resources Studies. The survey is designed to provide a comprehensive picture of the training of future scientists and engineers in the Nation's graduate schools. Data are used by Congress and the executive branch to determine areas of need during the preparation of the budget. In addition, NSF data are used by State government agencies and other analysts to assess future supply and demand of S/E personnel.

General Definitions

A **graduate science/engineering (S/E) student** is defined as a student enrolled for credit in an advanced-degree program (leading to either a master's or Ph.D. degree) in fall 1986. Do **not** report M.D., D.V.M., or D.D.S. candidates, interns, and residents **unless** they are concurrently working for a master's or Ph.D. in a science or engineering field or are enrolled in a joint M.D./Ph.D. program. Individuals who already hold an M.D., D.V.M., or D.D.S., master's or Ph.D. degree but who are working on **another master's or Ph.D. degree** are to be counted as **graduate students, either full or part time. Do not** report such individuals as postdoctorates in item 8.

Graduate S/E students performing thesis or dissertation research away from the campus (for example, at Government- and contractor-owned facilities) in the United States are to be *included* as long as they are enrolled for credit in an advanced-degree program. Students enrolled in a foreign country (at a branch or extension center) are to be *excluded*.

A graduate S/E student, whether full- or part-time, should be reported in **only one department.** If any students are in interdisciplinary programs, please be sure that they are counted only once, by their "home" department. If a graduate student is enrolled in an inter-institutional program, please report the student only if the degree will be granted by your institution. Please report in terms of headcounts, *not* in full-time equivalent (FTE) terms. Please do not report decimals or fractions. If data are unavailable or unknown, write "unavailable" or "unknown" in the blank. "N/A" means "not applicable" on this form. Data cells left blank are presumed to be zeros.

Item Instructions and Definitions

FULL-TIME GRADUATE S/E STUDENTS, item 5: A full-time graduate student is defined as a student enrolled for credit in an advanced-degree program (not a regular staff member or a postdoctorate) who is engaged **full time** in training activities in his/her field of science/engineering; these activities may embrace any appropriate combination of study, teaching, and research, depending on **your institution's own policy.** Do not include part-time students, even if they receive outside financial support.

MECHANISMS OF SUPPORT, item 5, lines (1)-(5): Students who receive *fellowships* or *traineeships* should be reported on line (1) or (2) respectively, if either of these mechanisms constitute the **largest source of their support.** The Federal Interagency Committee on Education (FICE) differentiates between *fellowship* and *traineeship* stipends as follows: 1) A **fellowship** is an award made directly to, or on behalf of, a student selected in a competition, usually national in scope, to enable him to pursue post-baccalaureate training, and 2) a **traineeship** is an educational award to a student selected by his university. Except for the selection process, the terms and conditions of the two types of awards are generally identical. A student receiving his/her main support from an assistantship should be classified as a research assistant on line (3) or as a teaching assistant on line (4), depending on how he/she spends the majority of his/her time, e.g., a graduate student devoting most of his/her time to teaching should be classified as a teaching assistant. All other full-time graduate students, **including members of the armed forces whose tuition is paid by the Department of Defense,** should be reported on line (5).

STUDENTS RECEIVING FINANCIAL ASSISTANCE, item 5, columns (A) through (I): Report the number of **full-time** graduate S/E students in the appropriate column according to the source of the largest proportion of their support.

FEDERAL SOURCES, columns (A) through (F): Students receiving the largest portion of their support from Federal Government *loans* should be reported as *self-supported,* column (J).

Department of Defense (DOD), column (A): Report full-time graduate students receiving support from the Department of the Army, Navy, or Air Force, as well as from programs within the Office of the Secretary of Defense. Officers on active duty whose tuition is being paid by DOD should be included in this column under "Other Types of Support," line (5). Students receiving their main support from the Veterans Administration under the G.I. Bill should be reported under column (F), "Other Federal sources."

Department of Health and Human Services (HHS), columns (B) and (C): Report full-time graduate students receiving support from the institutes or divisions of the **National Institutes of Health (NIH)** under column (B); support from all other components of HHS should be reported under column (C), as indicated below:

National Institutes of Health, report in column (B):

- Division of Research Resources
- National Cancer Institute
- National Center for Nursing Research
- National Eye Institute
- National Heart, Lung, and Blood Institute
- National Institute on Aging
- National Institute of Allergy and Infectious Diseases
- National Institute of Arthritis and Musculoskeletal and Skin Diseases
- National Institute of Diabetes and Digestive and Kidney Diseases
- National Institute of Child Health and Human Development
- National Institute of Dental Research
- National Institute of Environmental Health Sciences
- National Institute of General Medical Sciences
- National Institute of Neurological and Communicative Disorders and Stroke
- National Library of Medicine

Other HHS, report in column (C):

- Alcohol, Drug Abuse, and Mental Health Administration (including National Institute of Mental Health)
- Centers for Disease Control
- Food and Drug Administration
- Health Resources and Services Administration
- Office of Human Development and Services

U. S. Department of Agriculture (USDA), column (E): Report all graduate students supported by USDA funds, including research assistants working on projects financed out of Hatch, McIntyre-Stennis, or Smith-Lever formula funds, competitive research grants, and institution fellowship/training grants.

Other Federal sources, column (F): Report the number of full-time graduate S/E students receiving support from all other Federal agencies, including the Department of Education. Those supported under Fulbright scholarships administered by the Department of State should be reported in this column, as well as those receiving support from the Veterans Administration under the G.I. Bill.

NON-FEDERAL SOURCES, columns (G) through (I): **Institutional support,** column (G): Report full-time graduate S/E students receiving support from your own institution, including those supported through tuition waivers, and by State and local governments. Students supported by funds given to a university by the Federal Government, such as training grant funds, should be reported under the appropriate Federal agency and NOT reported as *institutional support.*

Foreign sources, column (H): Include support from any non-U.S. source, such as foreign governments, industrial firms, or specialized agencies of the United Nations.

Other U.S. sources, column (J): Include support from nonprofit institutions, private industry, and all other U.S. sources. If possible, please provide separate totals for those supported by industrial and nonprofit sources, either in the space provided for "Comments" or on a separate sheet. Note that students primarily supported by State and local governments should be reported in column (G).

SELF-SUPPORTED STUDENTS, column (I): Include full-time graduate S/E students whose main source of support is derived from loans from any source and from personal or family financial contributions. Full-time graduate students receiving the largest portion of their support from Federal loans should be reported here. Note that these students should be included in the total, column (K). Foreign students relying on self and family support are to be reported here also.

Women, line (7): Report all women S/E students by their source of main support. Please note that in each column, data on line (7) should not exceed the total on line (6).

First-year students, lines (8) and (9): A first-year student is defined as one who will have completed **less than a full year** of graduate study as of the beginning of the fall term in 1986 **in the program in which he/she is enrolled for a degree.** All other graduate S/E students should be considered beyond their first year.

PART-TIME GRADUATE S/E STUDENTS, item 6: A part-time graduate student is defined as a student who is enrolled in an advanced-degree program who is NOT pursuing graduate work full time as defined by your institution. *All* part-time graduate students should be reported here, whether or not they receive outside support.

CITIZENSHIP AND RACIAL/ETHNIC BACKGROUND, item 7: Racial/ ethnic designations as used in this survey do not denote scientific definitions of anthropological origins; thus, a graduate student may be included in the group to which he/she appears to belong, identifies with, or is regarded in the community as belonging. No person should be counted in more than one racial/ethnic group, however, and **only those with U.S. citizenship** should be reported in columns (A) through (F). Non-U.S. citizens, **whether holding temporary or permanent visas,** should be reported as FOREIGN in column (G).

On line (1), report the total number of full-time S/E graduate students under the appropriate racial/ethnic category. The total for each line should equal the sum of columns (A) through (G). The total for full-time enrollment shown in item 7 should match the total shown in item 5; similarly, the part-time total shown in item 7 should equal the total in item 6.

The following racial/ethnic designations are those defined by the Bureau of the Census:

U. S. CITIZENS, columns (A) through (F): *Black, non-Hispanic,* column (A): Report persons having origins in any of the black racial groups (except those of Hispanic origin).

American Indian or Alaskan native, column (B): Report persons having origins in any of the original peoples of North America.

Asian or Pacific Islander, column (C): Report persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. These areas include China, Japan, Korea, the Philippine Islands, and Samoa.

Hispanic, column (D): Report persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

White, non-Hispanic, column (E): Report persons having origins in any of the original peoples of Europe, North Africa, or the Middle East, except those of Hispanic origin. Other and unknown, column (F): If department records are not complete as to racial/ethnic origin of some graduate students, please report in column (F) those students with U.S. citizenship whose origins are not listed in item 7, as well as those whose origins are unknown.

FOREIGN, column (G): Please report all foreign students, whether nonresident alien or holding a permanent visa, in column (G). A *foreign* graduate student is defined as an individual who has not attained U.S. citizenship. Do not include native residents of a U.S. possession, such as American Samoa. Applicants for U.S. citizenship are to be considered as foreign until the date their citizenship becomes effective.

POSTDOCTORATES AND NONFACULTY DOCTORAL RESEARCH STAFF, item 8: Include as **postdoctorates** those individuals with science or engineering Ph.D.'s, M.D.'s, D.D.S.'s, or D.V.M.'s (including foreign degrees that are equivalent to U.S. doctorates) who devote *their primary effort to research activities* or study in the department under temporary appointments carrying no academic rank. Such appointments are generally for a *specific time period.* They may contribute to the academic program through seminars, lectures, or working with graduate students. Their postdoctoral activities provide additional training for them. **Exclude** clinical fellows and those with appointments in residency training programs in medical and health professions, unless *research training* under the supervision of a *senior mentor* is the *primary purpose* of the appointment.

On line (1) of item 8, under columns (A) and (B), enter the number of fellows and trainees receiving support under Federal fellowships and/or training grants. Under column (C) enter the number of postdoctorates who are receiving federally supported research grants. The remaining postdoctoral appointees receiving non-Federal support should be entered under column (D). Of the *total* in column (E), enter in column (F) the number of postdoctorates who are foreign.

Under **other nonfaculty doctoral research staff,** column (G), report all doctoral scientists and engineers who are involved principally in research activities but who are considered *neither* postdoctoral appointees nor members of the *regular* faculty.

On line (2), report the number of women in each category. On line (3) report those postdoctorates and nonfaculty doctoral research staff who hold first professional medical degrees (M.D., D.D.S., D.V.M., etc.). Please note that in each column, data on lines (2) and (3) should not exceed the total on line (1).

UPON COMPLETING THIS FORM, PLEASE RETURN IT TO YOUR SURVEY COORDINATOR FOR TRANSMITTAL BY JANUARY 30, 1987

NSF Form 812, Aug. 86

NATIONAL SCIENCE FOUNDATION and NATIONAL INSTITUTES OF HEALTH

Survey of Graduate Science and Engineering Students and Postdoctorates, Fall 1986

Form Approved
OMB No. 3145-0062
Appr. Exp. 8/31/89

DEPARTMENTAL OR PROGRAM DATA SHEET

Before filling out, please read the instructions. Upon completion, return form to your survey coordinator.
The due date for this survey is January 30, 1987.

1. Name and address of institution ____________________

2. Name of science or engineering department (or program) covered by this data sheet: ____________________
(If changed since last year, please indicate previous name under "Comments.")

3. Person in department (or program) preparing this form:

Name ____________________

Title ____________________ Phone ( ) ________

4. Highest degree granted by department or program in 1986/87. (CHECK ONE ONLY) If your department has never granted a graduate degree, but is a department of clinical medicine with or without postdoctorates, check (3). Doctorate ________ (1) Master's ________ (2) No graduate degree offered ________ (3)

(LEAVE BLANK)

Response code .... ☐

Institution and department code

If your department or program does not enroll graduate students, please move to item 8 below. For identification of S/E fields classification, see your coordinator's NSF/CS "Crosswalk." If data are unavailable or unknown, write "unavailable" or "unknown" in the blank. "N/A" means "not applicable" on this form. Data are to be reported on a "headcount" basis: please DO NOT USE DECIMALS OR FRACTIONS in items 5 through 8.

5. NUMBER OF **FULL-TIME** GRADUATE STUDENTS enrolled for advance degrees (master's and doctorate) in **fall 1986 (headcounts - no fractions or decimals). Report each full-time graduate student only once** according to the source and mechanism of the **largest amount of support** received in the fall of 1986. Students receiving equal amounts from two or more sources or through two or more mechanisms should be reported only once. To determine the primary source, consider only tuition and other academic expenses. Students receiving the largest portion of their support from Federal Government **loans** should be reported as self-supported. Column (J). Line 6, column (K) is the **total number of full-time graduate students** enrolled. Please note that darkened cells should be left blank.

MECHANISMS OF SUPPORT		STUDENTS RECEIVING FINANCIAL ASSISTANCE									SELF SUPPORTED STUDENTS	TOTAL FULL-TIME GRADUATE ENROLLMENT
		FEDERAL SOURCES (excluding loans)						NON-FEDERAL SOURCES				
			HHS									
		Department of Defense (A)	National Institutes of Health (B)	Other HHS (C)	National Science Foundation (D)	Department of Agriculture (E)	Other Federal sources[1] (F)	Institutional support (including State and local government) (G)	Foreign sources (H)	Other U.S. sources[2] (I)	(Including loans and family sources) (J)	(Sum of (A) thru (J))[3] (K)
Graduate Fellowships	(1)											
Graduate Traineeships	(2)											
Graduate Research Assistantships	(3)											
Graduate Teaching Assistantships	(4)											
Other Types of Support	(5)											
FULL-TIME TOTAL	(6)											
For **each total** on line (6) how many are WOMEN? (Should not exceed totals on line (6)).	(7)											

FIRST-YEAR STUDENTS	(8)	Of the full-time graduate students on line (6), column (K), how many are FIRST-YEAR students? (Should not exceed total on line (6)).	
FIRST-YEAR WOMEN STUDENTS	(9)	Of the full-time FIRST-YEAR graduate students on line (8), how many are WOMEN?	

---

[1] **Please list agencies and number supported by each under "Comments," or attach a separate sheet.**

[2] **Include support from nonprofit institutions, industry and all other U.S. sources. Please report under "Comments" totals for those students supported by industrial sources and by nonprofit sources.**

[3] **The total from line (6) should be inserted in item (7), line (1), column (H).**

6. Number of **PART-TIME GRADUATE S/E STUDENTS**, FALL 1986 (Headcounts-no fractions or decimals.)

PART-TIME TOTAL[1]	(1)	
Of the part-time total on line (1), how many are WOMEN? (Should not exceed total on line (1).)	(2)	

[1] The total should be inserted in item 7, line (2), column (H)

7. RACIAL/ ETHNIC BACKGROUND OF GRADUATE S/E STUDENTS, FALL 1986	**Of the graduate student totals in items 5 and 6, how many belong to the following racial/ethnic categories? Be sure to count each student only once.**		U.S. CITIZENS ONLY						FOREIGN[1] (G)	**TOTAL** (Sum of (A) thru (G)) (H)
			Black non-Hispanic (A)	Amer. Indian/ Alaskan Native (B)	Asian/ Pacific Islander (C)	Hispanic (D)	White non-Hispanic (E)	Other or unknown (F)		
	FULL TIME, column (H), should equal item 5, line (6), column (K)	(1)								
	PART TIME, column (H), should equal item 6, line (1)	(2)								

[1] Please include all non-U.S. citizens, whether holding temporary or permanent visas, in column (G)

8. Number of S/E POSTDOCTORATES and NONFACULTY DOCTORAL RESEARCH STAFF, FALL 1986. (Include those affiliated with this department as well as those employed in associated academic research units. Exclude clinical fellows and residents not involved in research.)		POSTDOCTORATES							OTHER NON-FACULTY DOCTORAL RESEARCH STAFF (G)
		SOURCE OF SUPPORT				TOTAL for all sources (A) thru (D) (E)	Of the total in (E), how many are FOREIGN? (F)		
		Federal			Non-Federal (D)				
		Fellowships (A)	Traineeships (B)	Research grants (C)					
TOTAL	(1)								
Of the total in each cell of line (1), how many are WOMEN?	(2)								
Of the total in each cell of line (1), how many hold the M.D., D.D.S. or D.V.M. degree?	(3)								

Check List

☐ 1 Do all entries reflect headcounts and **NOT** FTE's?

☐ 2. **Do the data in items 5, 7, and 8 add to totals?**

☐ 3 Have you **included** all **self-supported** full-time graduate S/E students in item 5, column (J)? Note that **self-supported** students should also be included in the total, column (K)

☐ 4 Have you **excluded** M.D., D.D.S., and D.V.M. candidates, interns, and residents (except those enrolled in joint programs with the Ph.D.) from items 5, 6, and 7?

☐ 5 Does item 5, line (6), column (K) equal item 7, line (1), column (H)?

☐ 6 Does item 6, line (1) equal item 7, line (2), column (H)?

Approximately how many personhours were required to complete this form? ☐

Comments (including explanations of any variances from prior year's data) and further detail on students receiving funding from other sources:

NOTE: This information is solicited under the authority of the National Science Foundation Act of 1950, as amended. All information you provide will be used for statistical purposes only. Your response is entirely voluntary and your failure to provide some or all of the information will in no way adversely affect your institution.

scientific and engineering personnel employed at universities and colleges

purpose and background

The purpose of this survey is to provide quantitative information on professional science and engineering (S/E) personnel employed by universities and colleges. The survey was conducted annually between 1973 and 1985; prior to 1973, it was conducted periodically. The survey was not conducted in 1986, but OMB/FEDAC clearance has been obtained to resume the survey in 1987 with sample coverage restricted to S/E doctorate-granting institutions.

survey instrument

Three major variables have been collected over the course of this survey: Headcounts of the number of scientists and engineers by highest earned degree and employment status (full-time/part-time); headcounts by detailed S/E field, sex, and employment status; and total full-time-equivalent (FTE) personnel and FTE personnel devoted to separately budgeted research and development (R&D) activities by detailed S/E field.

sample design

Until 1984, all U.S. universities and colleges which employ scientists or engineers were surveyed, as were all university-administered federally funded research and development centers (FFRDC's). In 1984, the survey was converted to a sample survey of approximately 1,100 institutions. All doctorate-granting institutions and their FFRDC's and all historically black universities and colleges were included with certainty, as well as other nondoctorate-granting institutions with at least 275 full-time and 75 part-time S/E employees reported in the January 1982 survey. The 1982 survey universe was also the basis for drawing the random sample of remaining institutions which was stratified on the basis of full- and part-time employment.

data availability

Prior to January 1979, data were collected for both full- and part-time personnel by the function (teaching, research, or other) in which they were *primarily* employed, by detailed S/E field. Headcounts for both full- and part-time personnel were also collected by highest earned degree and function of primary employment. Additional questionnaire items requested S/E personnel headcounts of doctorates by broad S/E field and employment status; headcounts for full-time personnel by detailed field and sex; and headcounts for technicians by broad area and primary function. FTE counts were collected only for all-field totals prior to 1979 and were available by employment status and primary function.

Over time the scope of the survey has varied because of concern about response burden. Data on the distribution of personnel according to degree level and function of primary employment have not been collected since 1978. The items on primary function by field were converted to an FTE concept on a permanent basis on the shortened questionnaire used in 1979. All items on distributions of personnel by degree level or by sex were omitted from the shortened 1979 form but were returned to the full-scale survey form in 1980. The items on function of primary employment and the item on technicians last appeared on the 1978 survey form.

In addition to the reduced number of data items on the 1979 questionnaire, the scope of the survey was further restricted in that only doctorate-granting institutions and FFRDC's were surveyed. Prospective data users must therefore exercise care and judgment in interpreting and utilizing the 1979 data; data aggregates, for example, should not be treated as national totals. Data elements for the 1980 through 1985 surveys were essentially identical.

data access

Summary information in the form of statistical tables are available on diskettes suitable for use on an IBM-compatible microprocessor. Inquiries regarding this survey should be addressed to:

Ms. Judith Coakley/Ms. Esther Gist
Division of Science Resources
Studies
Universities and Colleges
Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L602
Washington, D.C. 20550
(202) 634-4673

Data for 1978 through 1985 are available on a single multiyear magnetic data tape. Data for 1973 through 1977 are available on separate tapes. For further information regarding data tape availability or contents, please contact:

Mr. George Nozicka
Quantum Research Corporation
7300 Pearl Street, Suite 210
Bethesda, Maryland 20814
(301) 657-3070

The cost of the multiyear tape is $325 and a single year is $100. A *Data User Guide* has been developed for the 1978-85 period that documents the compatible code structure utilized in the NSF academic surveys. Copies are available from the Universities and Colleges Studies Group/Division of Science Resources Studies.

NSF FORM 724A (11-84)

OMB No. 3145-0074
Exp. Date: 12/31/85

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF SCIENTIFIC AND ENGINEERING PERSONNEL EMPLOYED AT UNIVERSITIES AND COLLEGES, JANUARY 1985

Organizations are requested to complete and return this form to:

NATIONAL SCIENCE FOUNDATION
1800 G Street, N.W., Room L-602
Washington, D.C. 20550—Attn: UNISG

This information is solicited under the authority of Section 3 (a) (6) of the National Science Foundation Act of 1950, as amended (42 U.S. Code 1862 (a) (6)). Your response is entirely voluntary and your failure to provide some or all of the information will in no way adversely affect your institution.

Please correct if name or address has changed.

This survey requests scientific and engineering (S/E) employment data according to institutional recordkeeping conventions. **The completed 1985 questionnaire should be returned by March 15, 1985.** Your prompt cooperation will be appreciated. If you determine, however, that you cannot respond by March 15, please notify NSF and request an extension of time.

Please read the enclosed instructions before completing this form. If you have any questions, contact Ms. Judith Coakley or Ms. Esther Gist (202-634-4673). Please complete all columns; estimates by academic officials will be better than NSF estimates.

All entries should be in whole numbers; please do not enter decimals or fractions, except in item 3, columns 2 and 3, where two decimal places are optional.

SURVEY POPULATION

Include data for ALL ORGANIZATIONAL UNITS OF YOUR INSTITUTION THAT EMPLOY SCIENTISTS AND ENGINEERS, such as regional campuses, computer centers, medical schools, agricultural experiment stations, and associated research units. Also include any hospital or clinic owned, operated, or controlled by your university and integrated operationally with the clinical programs of your medical schools.

Federally Funded Research and Development Centers (FFRDC's)

Separate forms have been mailed directly to all FFRDC's administered by academic institutions. A list of these centers appears on page 3 of the Instructions and Definitions.

INSTITUTIONAL CLASSIFICATION

Highest degree granted in the sciences or engineering during 1984-85	Check one	One example of a science or engineering field in which highest degree was awarded	Check primary administrative control of your institution	
Doctor's degree, e.g., Ph.D., D. Eng., or D.E.S.	☐		Federal	☐
First-professional degree, e.g., M.D., D.D.S., D.V.M., etc.	☐		State	☐
Master's degree	☐			
Bachelor's degree	☐		Local	☐
Associate or other 2-year award	☐			
No degrees granted in the sciences or engineering	☐		Private	☐

Item 1. **Total number of scientists and engineers by highest earned degree and employment status: January 1985**

HIGHEST EARNED DEGREE		HEADCOUNTS		
		TOTAL (1)	FULL TIME (2)	PART TIME (3)
a. Doctor's degree, e.g., Ph. D., D. Eng., or D.E.S.	2210			
b. First-professional degree, e.g., M.D., D.D.S., D.V.M., etc.	2220			
c. Master's degree	2230			
d. Bachelor's degree or the equivalent	2240			
e. Total (sum of a through d)	2200			

NOTE: To ensure proper data comparability between item 1, line 2200, and items 2 and 3:

a) Line 2200, column 1 should equal item 3, line 2700, column 1;
b) Line 2200, column 2 should equal item 2, line 2600, column 1;
c) Line 2200, column 3 should equal item 2, line 2600, column 2.

Item 2.

Total number of scientists and engineers by discipline, sex, and employment status: January 1985

S/E DISCIPLINES[1]	HEADCOUNTS					
	TOTAL		MEN		WOMEN	
	Full time	Part time	Full time	Part time	Full time	Part time
	(1)	(2)	(3)	(4)	(5)	(6)
a. Engineers (total) 2610						
(1) Aeronautical and astronautical engineers .. 2611						
(2) Chemical engineers 2612						
(3) Civil engineers 2613						
(4) Electrical engineers 2614						
(5) Mechanical engineers 2615						
(6) Other engineers 2616						
b. Physical scientists (total) 2620						
(1) Astronomers 2621						
(2) Chemists 2622						
(3) Physicists 2623						
(4) Other physical scientists . 2624						
c. Environ. scientists (total) 2630						
(1) Atmospheric scientists ... 2631						
(2) Earth scientists 2632						
(3) Oceanographers 2633						
(4) Other environ. sci. 2634						
d. Mathematical and computer scientists (total) 2640						
(1) Mathematicians (exclude computer scientists) 2641						
(2) Computer scientists (exclude programmers) .. 2642						
e. Life scientists (total) 2650						
(1) Agricultural scientists 2651						
(2) Biological scientists 2652						
(3) Medical scientists (see instructions, p. 4) 2653						
(4) Other life scientists 2654						
f. Psychologists (total) 2660						
g. Social scientists (total) (exclude historians) 2670						
(1) Economists 2671						
(2) Political scientists 2672						
(3) Sociologists 2673						
(4) Other social scientists 2674						
h. Total (sum of a thru g) 2600						

PLEASE EXCLUDE from your response any employees in the fields of education, law, humanities, music, the arts, physical education, library science, and all other nonscience fields.

[1] See enclosed Crosswalk between NSF's S/E disciplines and the codes in the NCES Classification of Instructional Programs.

Item 3.

Total number of scientists and engineers by discipline, estimated full-time equivalents, and R&D activity: January 1985

S/E Disciplines		Total headcounts[1]	Estimated full-time-equivalents (FTE's)		
			Total FTE's[2]	FTE's devoted to separately budgeted R&D[3]	
				Number	Percent (optional)[4]
a. Engineers (total)	2710				
(1) Aeronautical and astronautical engineers	2711				%
(2) Chemical engineers	2712				%
(3) Civil engineers	2713				%
(4) Electrical engineers	2714				%
(5) Mechanical engineers	2715				%
(6) Other engineers	2716				%
b. Physical scientists (total)	2720				
(1) Astronomers	2721				%
(2) Chemists	2722				%
(3) Physicists	2723				%
(4) Other physical scientists	2724				%
c. Environmental scientists (total)	2730				
(1) Atmospheric scientists	2731				%
(2) Earth scientists	2732				%
(3) Oceanographers	2733				%
(4) Other environmental scientists	2734				%
d. Mathematical and computer scientists (total)	2740				
(1) Mathematicians (exclude computer scientists)	2741				%
(2) Computer scientists (exclude programmers)	2742				%
e. Life scientists (total)	2750				
(1) Agricultural scientists	2751				%
(2) Biological scientists	2752				%
(3) Medical scientists (see instructions, p. 4)	2753				%
(4) Other life scientists	2754				%
f. Psychologists (total)	2760				
g. Social scientists (total) (exclude historians)	2770				
(1) Economists	2771				%
(2) Political scientists	2772				%
(3) Sociologists	2773				%
(4) Other social scientists	2774				%
h. Total (sum of a thru g)	2700				

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[1] Line 2700, column 1, should equal item 1, line 2200, column 1.

[2] Include all activities, e.g., teaching, separately budgeted R&D, etc., of all individuals reported in column 1.

[3] See section 8 in Instructions for definition of "separately budgeted R&D expenditures."

[4] Column 4 has been provided for the convenience of those institutions that estimate the number (column 3) of FTE's devoted to separately budgeted R&D activities by use of a percentage (column 4) in each discipline.

CHECK LIST

( ) 1. Are all entries rounded to whole numbers? Please do not enter fractions or decimals, except in columns 2 and 3 where two decimal places are optional.

( ) 2. Do the data add to subtotals?

( ) 3. Are all columns completed? YOUR estimates will be better than OURS. An explanation of estimates may be noted on a separate sheet or in the REMARKS.

( ) 4. Are all branches and components such as medical school, computer center, agricultural experiment station, and associated research units included?

( ) 5. Have you INCLUDED all postdoctorates?

( ) 6. Have you EXCLUDED graduate students?

1984-85 DATA CHECK

(For your convenience)

Please compare your January 1984 survey response with your survey response for January 1985, particularly for the totals. Please explain below or on a separate sheet any significant changes. Where possible, indicate any required adjustments in data reported in previous years.

	1984	1985
Total full-time scientists and engineers	Line 2600, column 1. ☐	Line 2600, column 1. ☐
Total part-time scientists and engineers	Line 2600, column 2. ☐	Line 2600, column 2. ☐
Total FTE's	Line 2700, column 2. ☐	Line 2700, column 2. ☐
Total FTE's in R&D	Line 2700, column 3. ☐	Line 2700, column 3. ☐

CONFIDENTIALITY

The National Science Foundation recognizes that its ability to gather much of the enclosed information would be severely impaired if it could not be held in confidence. Please indicate below the number of any items that you would not supply unless assured that the source is held confidential. The Foundation will hold in confidence such information to the extent permitted by law.

ITEM:

REMARKS

What methods and source records were used for estimating separately budgeted R&D effort?

Please indicate problems encountered in estimating R&D-related activity.

Please circle the month that your institutional data represent to reflect academic year 1984-85 employment.

1	2	3	4	5	6	7	8	9	10	11	12
Jan											Dec

Are there any significant changes in data reported in previous years?

How many person-hours were required to complete this form? ☐

PLEASE TYPE OR PRINT NAME OF PERSON SUBMITTING THIS FORM	TITLE	AREA CODE	EXCH	NO.	EXT.
NAME OF PERSON WHO PREPARED THIS SUBMISSION (If different from above)	TITLE	AREA CODE	EXCH	NO.	EXT.
NAME OF INSTITUTION	DATE	ADDRESS (number, street, city, State, ZIP code)			

NSF FORM 724B (11-84)

OMB No. 3145-0074
Exp. Date: 12/31/85

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF SCIENTIFIC AND ENGINEERING PERSONNEL EMPLOYED AT UNIVERSITIES AND COLLEGES, JANUARY 1985

INSTRUCTIONS AND DEFINITIONS

Introduction

This information is solicited under the authority of the National Science Foundation Act of 1950, as amended in P.L. 507 (42 U.S.C. 1862) (Section 3(a) (6)], and Executive Order 10521 (March 17, 1954). All information you provide will be used for statistical purposes only. Your response is entirely voluntary and your failure to provide some or all of the information will in no way adversely affect your institution.

The National Science Foundation requests your cooperation in completing the attached questionnaire covering the characteristics of personnel in your institution as they relate to the sciences and engineering. This form requests employment data in 1984-85 according to institutional recordkeeping coventions. The questionnaire should be completed and returned to NSF by March 15, 1985. If you determine, however, that you will not be able to respond by that date, please notify NSF and request an extension of time.

Where data you report in the current survey differ significantly from those reported in the previous survey, please indicate the reasons for the difference, such as "opening of new medical school," etc., at the end of the questionnaire in the "Remarks" section, or on a separate sheet of paper.

The survey procedures are outlined in flow chart format. (See pp. 5-8.)

If you have any questions regarding information requested on this form, write or telephone Ms. Judith Coakley or Ms. Esther Gist at the Universities and Nonprofit Institutions Studies Group, Division of Science Resources Studies, National Science Foundation, 1800 G Street, N.W., Room L-602, Washington, D.C. 20550 (Telephone: (202) 634-4673.) Additional forms, as well as copies of previous responses, may be obtained by writing to the above address.

Survey Instructions

1. *Survey Population*

This survey, conducted annually, covers professional employment at all academic institutions with a science or engineering (S/E) program. The institutional response to this survey should reflect personnel activity in all branches and other units of the parent institution, including regional campuses, computer centers, medical schools, agricultural experiment stations, and associated research units. If any data for any of these campuses are not included in your response to NSF, please indicate this under "Remarks" when submitting your questionnaire.

Federally funded research and development centers (FFRDC's) are to report their data separately from the administering university; see the listing of FFRDC's administered by academic institutions (p. 3.)

2. *Survey Time Period*

The January date referenced in this questionnaire reflects the midpoint of the 1984-85 academic year rather than the actual reporting date of data to be compiled for NSF. Data reported on this survey are to reflect a "snapshot" of S/E personnel employed at a fixed time during the 1984-85 academic year. For institutions reporting on the basis of central record systems, data should reflect the date when your files are "frozen" for annual personnel reports. Many institutions, especially those with State affiliation, use their central records compiled in the preceding fall of each year to report to NSF. You may want to report as of the payroll period closest to October 1, 1984-85, which is the basis for the Equal Employment Opportunity Commission's survey of higher education staff (EEO-6, Form 221). Please indicate the reporting month used by your institution in the space provided in the "Remarks" section.

3. *Professional Employment*

The term "professional," for purposes of this survey, refers to all persons paid a salary or stipend by the responding institution who work at a level at which the knowledge acquired by academic training equal to a bachelor's degree in science or engineering is essential in the performance of duties. Many institutions with central reporting systems use headcounts of *exempt* employees, i.e., those employees who are in the exempt category of the Fair Labor Standards Act as amended. Exempt employees are not eligible for overtime payment. Others use EEO-6 concepts.

Include: S/E personnel with faculty status, postdoctorates,[1] and other professional employees such as systems analysts in computer centers.

Exclude: (1) Personnel on sabbatical or other leave status even if these personnel continue to be paid by your institution; (2) personnel employed in branches of your institution located in foreign countries; (3) unpaid voluntary staff; (4) persons "unpaid" by the university but paid by the medical school; (5) student health service personnel; (6) those agricultural extension personnel primarily involved in home economics and 4-H youth programs; (7) administrative officers above the level of department chairpersons with titles such as president, academic dean, dean of faculty, provost, chancellor, etc., even though they may devote part of their time to teaching and/or research; (8) all graduate students.

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[1] Some institutions without comprehensive central records on the number of postdoctorates base their response to this survey on data gathered in the office of the graduate dean as part of NSF's Survey of Graduate Science and Engineering Students and Postdoctorates.

4. *Assignment of Scientists and Engineers to NSF Disciplines*

Determination of whether professional employees should be reported in the NSF personnel survey as "scientists and engineers" and their associated disciplines is done by most respondents on the basis of departmental structures. After particular departments are selected for inclusion in the NSF personnel survey, respondents usually classify headcounts of all professional employees into various S/E disciplines according to their primary or home department of assignment. Where individual assignments are split into two departments on a 50-percent basis, classification into a single NSF discipline should be made according to institutional conventions.

See the classification of Disciplines of Employment in the Sciences and Engineering, for the broad and detailed S/E disciplines of employment corresponding to those shown on the questionnaire, with illustrative categories of each discipline (pages 3 and 4.) Also, for those that use the NCES instructional program categories, see the enclosed "Crosswalk" between NSF's S/E fields and the codes in the NCES Classifications of Instructional Programs (NCES 81-323). Please note that education, law, humanities, music, the arts, physical education, and library science are not considered S/E disciplines for the purpose of this survey. This discipline-oriented taxonomy is used by institutions that compile their own departmental groupings for this NSF survey. While most respondents report S/E headcounts based on departmental structures, NSF recognizes that because of the multidisciplinary nature of many academic activities, degree specialties and departmental assignments may differ (e.g., a Ph.D. in mechanical engineering may be assigned to the department of orthopedics.) To promote ease of reporting and consistency of data among institutions, it is suggested that where these differences are not significant, all professionals in the department be assigned to a single discipline. In other instances, where sizable differences occur, institutional respondents may choose to report professionals employed in a single department into two or more disciplines. For example, an institution may have a single department of electrical engineering and computer science and report individuals into two separate disciplines on the NSF personnel survey according to their degree specialties.

It is important that respondents *include* in the survey scientists and engineers who are appointed to organizational units that are not part of *any* academic department. For example, scientists and engineers employed at a computer center that is not affiliated with a particular academic department should be *included* in the survey. In a similar manner an economist in a nonscience department should be reported. The most prevalent reporting practice for these nonacademic units is to assign groups of individuals to NSF disciplines according to their degree specialties, especially when multidisciplinary activities are prominent.

5. *Medical and Clinical Disciplines*

For purposes of this survey, all M.D.'s, D.D.S.'s, etc., *with faculty or academic appointments* are to be reported, including postdoctorates. NSF considers faculty status given to physicians, dentists, public health specialists, pharmacists, etc., to be an indicator of significant involvement in teaching, clinical investigation, or other R&D activities.

Exclude: (1) All medical practitioners, such as nurse anesthetists, occupational therapists, physical therapists, interns; (2) scientists or engineers whose primary employment is at independent hospitals even though they may perform some teaching or research functions for your institution through cooperative agreements; (3) unpaid voluntary staff at medical or dental schools; and (4) medical residents unless research training under the supervision of a senior mentor is the prime purpose of the appointment.

6. *Questionnaire Item 1, Highest Earned Degree and Headcounts*

a. Highest earned degree information is most commonly available in personnel, payroll, or budget files. Most academic institutions have a computerized system for updating highest earned degree data for professionals. If these files at your institution do not contain degree data, however, these data may be estimated using departmental records.

- For purposes of this survey, earned degrees are classified in four categories:

(1) Under "Doctorate Degree" include earned degrees carrying the title of Doctor, e.g., Ph.D., D. Eng., D.E.S., etc; include individuals holding both the Ph.D. degree and any other doctorate degree.

(2) Under "First-Professional Degree" include individuals whose highest earned degrees, e.g., M.D., D.D.S., D.V.M., etc., are first-professional medical degrees that represent the completion of the academic requirements based on programs that require at least 2 academic years of previous college work for entrance and require a total of at least 6 academic years of college work for completion. Specifically include in line 2b first-professional degrees in Medicine (M.D.), Dentistry (D.D.S. or D.M.D.), Veterinary Medicine (D.V.M.), Podiatric Medicine (D.P.M.) and Osteopathic Medicine (D.O.). Individuals holding both the Ph.D. degree and a first-professional degree such as the M.D., should be included in line 2a as mentioned in (1) above.

(3) Under "Master's Degree" include earned degrees carrying the title of Master that are above the bachelor's degree and are other-than-doctorate or first-professional degrees reported in lines 2a and 2b.

(4) Under "Bachelor's degree or the equivalent" include all individuals who have successfully completed a baccalaureate program of studies, usually requiring at least 4 years (or equivalent) of full-time college level study. For the purpose of this survey, 5-year bachelor's degree holders may be included in this category, as well as those who are considered to have the equivalent in experience, even if they have not earned such as degree.

b. *Headcounts*

(1) *Full-time* employees are those individuals available for full-time assignments at the date used for reporting in this survey, or those who are designated as "full time" in an official contract, appointment, or agreement. Determination of "full-time" designation should be based on institutional recordkeeping conventions and standards. Avoid double counting; if, for example, individuals are full-time employees but their assignments involve more than one department or campus, they should be counted as one full-time employee according to their primary or home department of assignment (or campus).

(2) *Part-time* employees are those individuals who work for a length of time in a day, week, etc., defined by your institution as part-time employment.

7. *Questionnaire Item 2, Sex of Full- and Part-time Scientists and Engineers*

Item 2 collects data on the sex of full- and part-time scientists and engineers, characteristics which are usually available in central records. Computer programs used to respond to other requests for employment data on women may often be modified to provide specialized information on scientists and engineers.

8. *Questionnaire Item 3, Full-Time-Equivalents (FTE's)*

a. The FTE reporting concept should reflect the actual utilization of S/E professionals in various disciplines and their involvement in separately budgeted R&D activities. While headcounts are usually reported on the basis of *primary* department of assignment, FTE reporting in various NSF disciplines should reflect multiple appointments. **For example, an individual with a 60-percent appointment in electrical engineering and a 40-percent appointment in computer science would be reported in FTE's in two NSF disciplines according to the 60-40 percent split in departmental assignments.** Accordingly, the FTE concept converts the number of persons with part-time or split appointments among various disciplines or activities to an equivalent number of full-time persons, in accordance with institutionally agreed upon conventions. The number of FTE's reported in column 2 of item 3 should be equal to or greater than the number of full-time employees in any given field, using decimals (proportion of 1.00) for part-time employees. Therefore, the number of FTE's would be equal to or less than the total headcount in any field, and equal to or greater than the number of full-time employees.

The procedures used to compile FTE data vary from institution to institution, depending largely on the records available. Generally, there are two categories of records available to institutions—budgeting information describing the allocation of personnel resources and/or data reflecting actual rather than planned utilization of the resources.

In converting S/E headcounts into FTE's, the following method is suggested:

(1) Categorize headcounts of all exempt employees in S/E departments, medical schools, agricultural experiment stations, research institutes, and other institutional organizational units into one of the NSF disciplines according to primary assignment;

(2) Within each discipline, differentiate employees as being either full time or part time (according to institutional practices);

(3) Calculate the full-time equivalents of full-time S/E personnel. Use budgetary or resource utilization records to report S/E employees with split appointments between departments and/or institutional units, and distribute these data according to appropriate NSF disciplines.

(4) Calculate the full-time equivalents of part-time S/E personnel and merge them into appropriate NSF disciplines.

b. *Full-Time-Equivalents in Research and Development (R&D)*

For purposes of this survey, report only the full-time-equivalent involvement of persons engaged in *separately budgeted research and development.*

R&D activities are systematic, intensive studies directed toward fuller knowledge of the subject studied. R&D is the same as "organized research" as defined in OMB Circular A-21 revised, July 23, 1982. It includes all R&D activities of an institution that are *separately budgeted and accounted for.* R&D includes both "sponsored research" activities (sponsored by Federal or non-Federal agencies and organizations) and "university research" (separately budgeted under an internal application of institutional funds).

Exclude: Time spent by professional employees on departmental research that is not separately budgeted, training grants, public service grants, demonstration projects, etc.

Estimating the division of time allocated or spent by individuals in separately budgeted R&D programs is difficult for many institutions. Again, procedures used to supply these data vary among institutions and the extent to which central reporting is feasible depends, by and large, on the degree to which budget/personnel/financial records are mechanized and linked. Among the procedures used by various institutions are the following:

(1) Using some generally held criteria at the institutional or departmental levels (i.e., three-fourths for instruction, one-fourth for research);

(2) Estimating separately budgeted R&D involvement or assignment obtained from payroll records, personnel records, or from employee contracts (i.e., salaries paid from separately budgeted R&D funds may be compared with total academic salaries of individuals);

(3) Asking research administrators, department chairpersons, or heads of other organizational units to furnish estimates of separately budgeted R&D involvement.

(4) Using faculty activity analyses in institutions where these are regularly conducted, and differentiating separately budgeted R&D activity from departmental research activity.

Federally Funded Research and Development Centers (FFRDC's)

For purposes of this survey, FFRDC's are defined as R&D organizations exclusively or substantially financed by the Federal Government and administered on a contractual basis by educational institutions or other organizations. The following is a current list of FFRDC's administered by universities and colleges:

Ames Laboratory
Argonne National Laboratory
Brookhaven National Laboratory
Center for Naval Analyses
Cerro Tololo Inter-American Observatory
E. O. Lawrence Berkeley Laboratory
E. O. Lawrence Livermore Laboratory
Fermi National Accelerator Laboratory
Jet Propulsion Laboratory
Kitt Peak National Observatory
Lincoln Laboratory
Los Alamos Scientific Laboratory
National Astronomy and Ionosphere Center
National Center for Atmospheric Research
National Radio Astronomy Observatory
Oak Ridge Institute of Nuclear Studies
Plasma Physics Laboratory
Sacramento Peak Observatory
Stanford Linear Accelerator Center

Classification of disciplines of Employment in the Sciences and Engineering. Illustrative subfields include:

ENGINEERING

Aeronautical & Astronomical: aerodynamics, aerospace, space technology.

Chemical: petroleum, petroleum refining process.

Civil: architectural, hydraulic, hydrologic, sanitary and environmental, structural, transportation.

Electrical: communication, electronic, power.

Mechanical: engineering mechanics.

Other Engineering: agricultural, industrial and management, metallurgical and materials, mining, nuclear, ocean engineering systems, textile, welding, ceramic, marine.

PHYSICAL SCIENCES

Astronomy: laboratory astrophysics, optical astronomy, radio astronomy, theoretical astrophysics, X-ray, gamma-ray, neutrino astronomy.

Chemistry: analytical, inorganic, organo-metallic, organic, pharmaceutical, physical, polymer science (exclude biochemistry).

Physics: acoustics, atomic and molecular, condensed matter, elementary particles, nuclear structure, optics, plasma.

Other Physical Sciences: used for multidisciplinary fields within physical sciences.

ENVIRONMENTAL SCIENCES (TERRESTRIAL AND EXTRATERRESTRIAL)

Atmospheric Sciences: aeronomy, solar, weather modification, extraterrestrial atmospheres, meteorology.

Earth Sciences: engineering geophysics, general geology, geodesy and gravity, geomagnetism, hydrology, inorganic geochemistry, isotopic geochemistry, organic geochemistry, lab geophysics, paleomagnetism, paleontology, physical geography and cartography, seismology.

Oceanography: biological oceanography, chemical oceanography, geological oceanography, physical oceanography, marine geophysics.

Other Environmental Sciences: used for multidisciplinary fields within environmental sciences.

MATHEMATICAL AND COMPUTER SCIENCES

Mathematics: algebra, analysis, applied mathematics, foundations and logic, geometry, numerical analysis, statistics, topology.

Computer Sciences: computer programming,[2] computer and information sciences (general), design, development, and application of computer capabilities to data storage and manipulation, information sciences and systems, systems analysis.

LIFE SCIENCES

Agricultural Sciences: agronomy, animal science, dairy science, forestry, horticulture, poultry science.

Biological Sciences: anatomy, bacteriology, biochemistry, biogeography, biophysics, ecology, embryology, entomology, evolutionary biology, genetics, immunology, microbiology, nutrition and metabolism, parasitology, pathology, pharmacology, physical anthropology, physiology, plant sciences, radiobiology, systematics, zoology, veterinary biology, food science and technology.

Medical Sciences: internal medicine, neurology, ophthalmology, preventive medicine and public health, psychiatry, radiology, surgery, veterinary medicine,[3] dentistry, pharmacy, podiatry, anesthesiology, chemotherapy, dermatology, geriatrics, nuclear medicine, obstetrics, gynecology, oncology, pediatrics, physical medicine and rehabilitation.

Other Life Sciences: all other health-related disciplines.[4]

PSYCHOLOGY

Psychology: animal behavior, clinical psychology, comparative psychology, counseling, and guidance, development and personality, educational, personnel, vocational psychology and testing, experimental psychology, ethology, industrial and engineering psychology, social psychology.

SOCIAL SCIENCES

Economics: econometrics and economics statistics, history of economic thought, international economics, industrial, labor and agricultural economics, macroeconomics, microeconomics, public finance and fiscal policy, theory, economic systems and development.

Political Science: regional studies, comparative government, history of political ideas, international relations and law, national, political and legal systems, political theory, public administration.

Sociology: comparative and historical, complex organizations, culture and social structure, demography, group interactions, social problems and social welfare, sociology theory.

Other Social Sciences: cultural anthropology, criminology, history of science, linguistics, socioeconomic geography, urban studies.

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[2] Personnel employed as computer programmers should *not* be reported as professionals.

[3] Institutions with schools of veterinary medicine should distribute professionals among the appropriate disciplines (agricultural, biological, and medical) rather than report all personnel as medical scientists.

[4] *Exclude* personnel primarily involved in direct patient care.

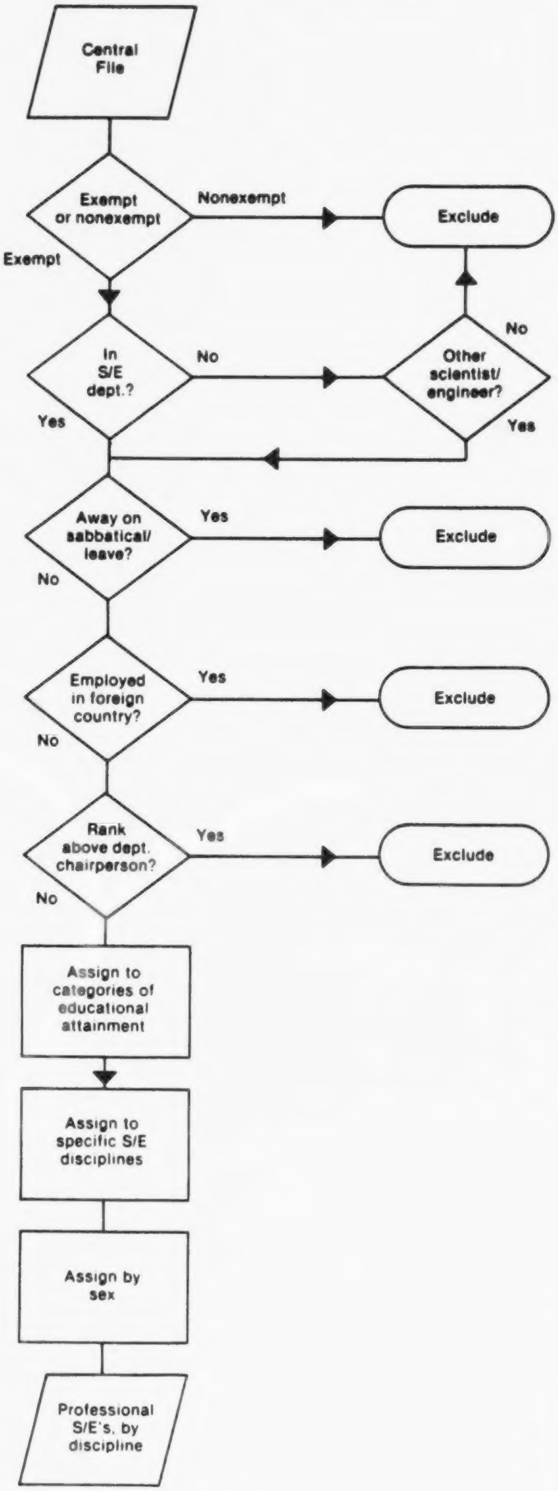
NOTE: See enclosed NSF Crosswalk between NSF field of S/E codes and the NCES Classification of Instructional Programs.

Flow Charts

Institutions that automate NSF survey data or plan to—or even engage in manual data processing—may be assisted by these charts.

STEP 1:

Retrieve, sort, and select information from central records of institution.


Central File
Exempt or nonexempt
Nonexempt
Exclude
Exempt
In S/E dept.?
No
Other scientist/engineer?
No
Yes
Yes
Away on sabbatical/leave?
Yes
Exclude
No
Employed in foreign country?
Yes
Exclude
No
Rank above dept. chairperson?
Yes
Exclude
No
Assign to categories of educational attainment
Assign to specific S/E disciplines
Assign by sex
Professional S/E's, by discipline

Central File: Contains centralized records for all paid employees. (*Note:* Some affiliated entities such as medical schools may have their own central files. See below.) Examples: Personnel, payroll, or general financial records.

Select personnel exempt from Fair Labor Standards Act. (See section 3 in Instructions.)

Select scientists and engineers (include postdoctorates) by "home" department. Exception: if "home" department is not science or engineering, and person holds joint appointment in S/E department.

See section 3 in Instructions.

See section 3 in Instructions.

See section 3 in Instructions.

See section 6 in Instructions.

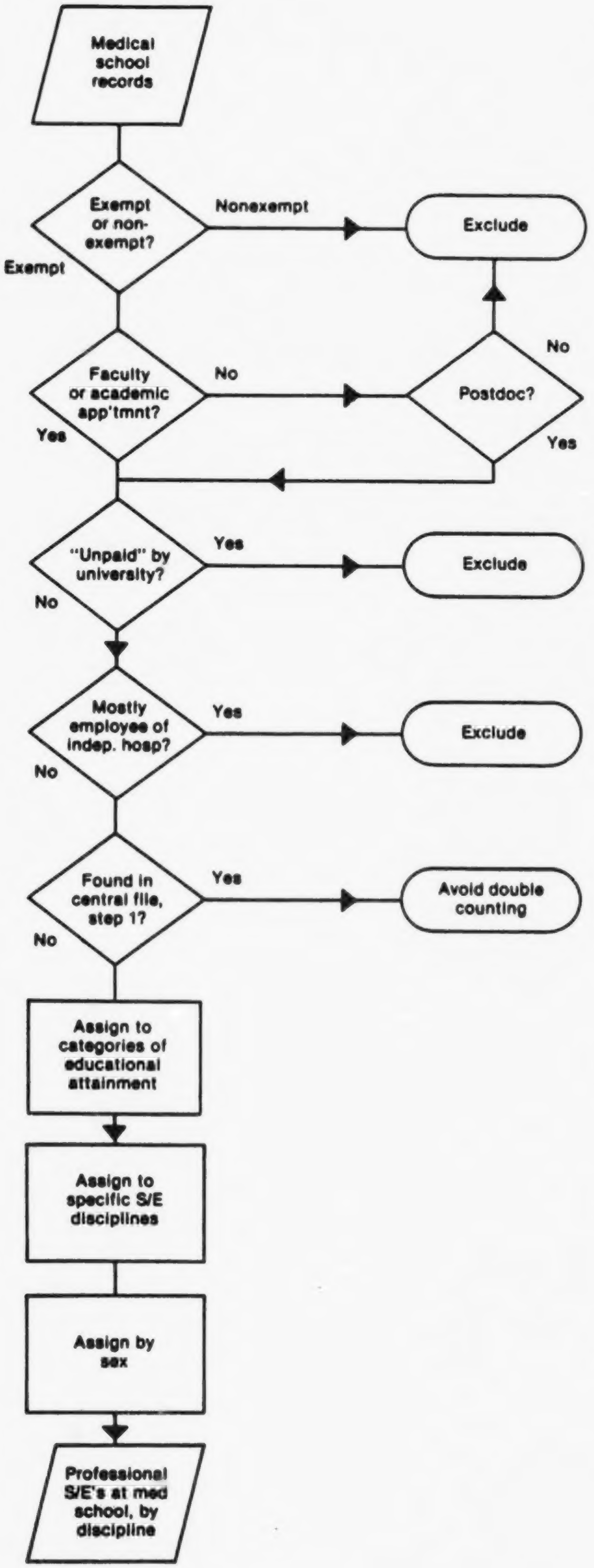
Assign to appropriate disciplines.

See section 7 in Instructions.

At this point you have extracted file containing all professional scientists and engineers covered by central records (but may be limited to those assigned to academic S/E departments in the institution proper).

STEP 2:

Collect information for medical school (if any) if not covered by central file of institution.



Medical school records
Exempt or non-exempt?
Nonexempt
Exempt
Exclude
Faculty or academic app'tmnt?
No
Yes
Postdoc?
No
Yes
"Unpaid" by university?
Yes
No
Exclude
Mostly employee of indep. hosp?
Yes
No
Exclude
Found in central file, step 1?
Yes
No
Avoid double counting
Assign to categories of educational attainment
Assign to specific S/E disciplines
Assign by sex
Professional S/E's at med school, by discipline

Refer to discussion of medical schools (section 5 in Instructions).

Select personnel exempt from Fair Labor Standards Act. (See section 3 in Instructions.)

Do not include medical school personnel unless they have faculty or academic appointments. Exceptions: postdoctorates. (See section 5 in Instructions.)

Exclude personnel "unpaid" by the university even if paid by the medical school. Exclude voluntary staff.

Scientists whose primary employment is at independent hospitals are to be excluded even if they perform teaching/research for your institution through cooperative agreements.

Some individuals may be included in both the institution's central records and the medical school records. Count such persons only once, but keep track of split assignments for FTE figures, below.

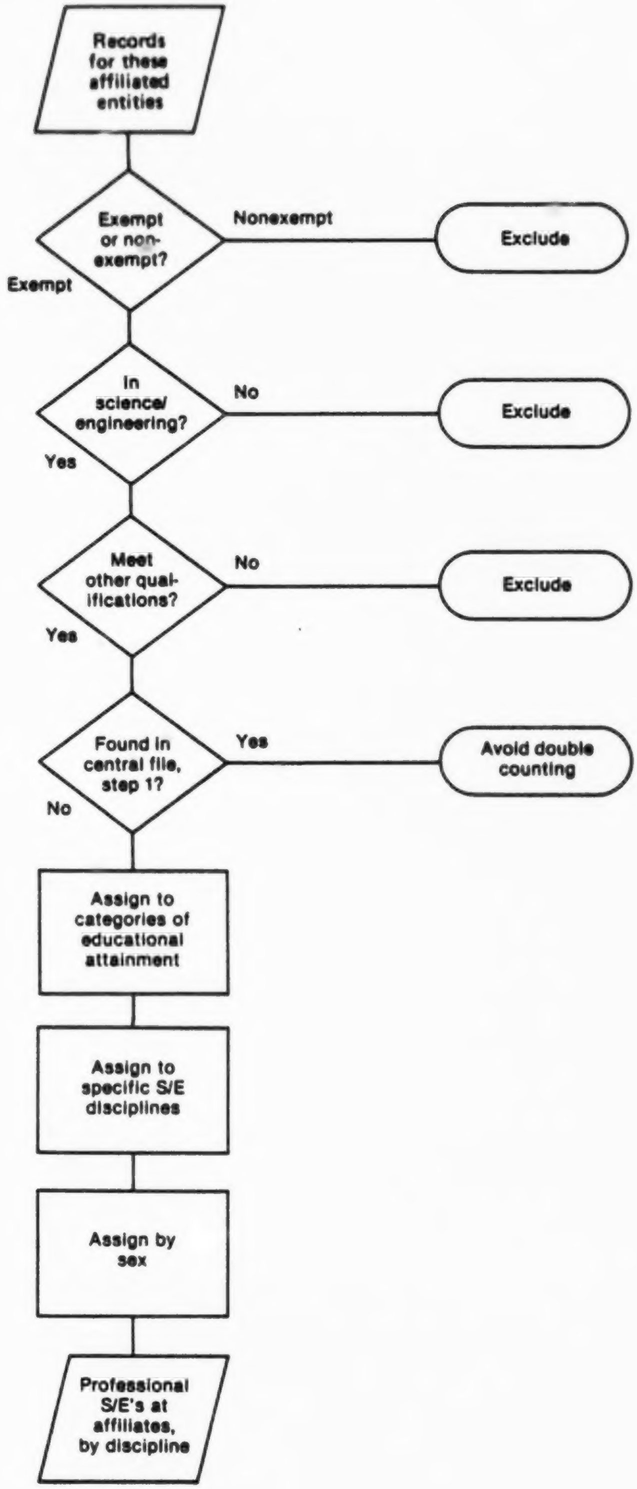
(See section 6 in Instructions.

Assign to appropriate disciplines.

See section 7 in Instructions.

STEP 3:

Collect information on any remaining affiliated entities not covered by files already processed. Such entities might include a regional campus, a computer center, an agricultural experiment station or an associated research unit (except for FFRDC's), etc. Also check for postdoctorates not included in central files (see footnote to section 3 in Instructions.)


Records for these affiliated entities
Exempt or non-exempt?
Nonexempt
Exclude
Exempt
In science/ engineering?
No
Exclude
Yes
Meet other qualifications?
No
Exclude
Yes
Found in central file, step 1?
Yes
Avoid double counting
No
Assign to categories of educational attainment
Assign to specific S/E disciplines
Assign by sex
Professional S/E's at affiliates, by discipline

See section 1 in Instructions.

Select personnel exempt from Fair Labor Standards Act. (See section 3 in Instructions.)

See discussions in sections 3 and 4 in Instructions.

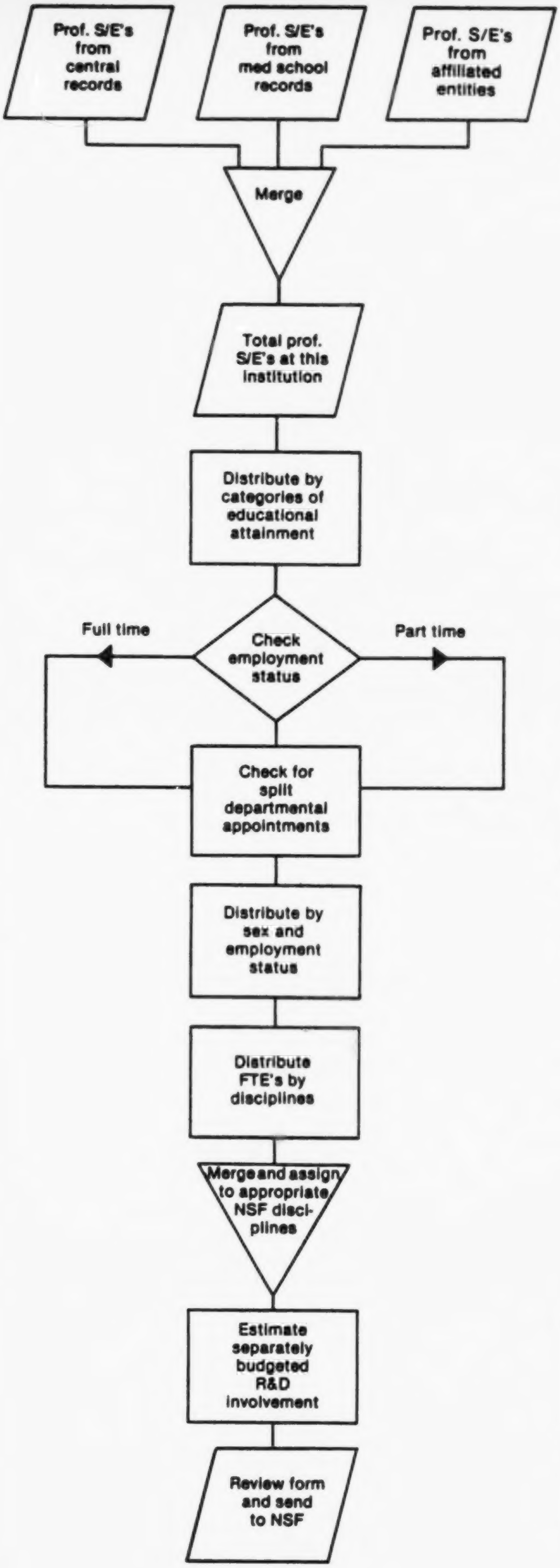
Note exclusions listed in section 3 in Instructions (e.g., exclude personnel away on sabbatical and voluntary staff.)

Some individuals may be included in both the institution's central records and the affiliated entity's files (e.g., a person teaching at both the main and a regional campus). Only count such persons once, but keep track of split assignments for FTE figures, below.

See section 6 in Instructions.

Assign to appropriate disciplines.

See section 7 in Instructions.



Prof. S/E's from central records
Prof. S/E's from med school records
Prof. S/E's from affiliated entities
Merge
Total prof. S/E's at this institution
Distribute by categories of educational attainment
Full time
Check employment status
Part time
Check for split departmental appointments
Distribute by sex and employment status
Distribute FTE's by disciplines
Merge and assign to appropriate NSF disciplines
Estimate separately budgeted R&D involvement
Review form and send to NSF

STEP 4:

Merge all extracted information, compute full-time-equivalents in each discipline for both full-time and part-time personnel, and determine extent of separately budgeted R&D involvement.

If duplicate entries have not already been eliminated, it may be convenient to do so at this stage.

Data required for item 1 have now been collected.

Use institutional definition for "part-time" employees. (See also discussion of "full time" in section 6 in Instructions.)

FULL TIME: Check for personnel assignments which are split across several disciplines. (See section 8 in Instructions.)

PART TIME: Use institutional conventions or practices to convert numbers of part-time personnel to the equivalent number of full-time individuals in each discipline. (See section 8 in Instructions.)

Data required for item 2 have now been collected.

For all personnel, determine the proportion of time spent in separately budgeted R&D programs. Use institution's conventions or data from faculty activity analyses, salaries paid from research funds, etc. (See section 8 in Instructions.)

Data required for item 3 have now been collected.

research participation and characteristics of science and engineering faculty

purpose and background

The purpose of this survey is to provide information about the characteristics and research activities of science and engineering (S/E) faculty and nonfaculty research doctorates at doctorate-granting institutions. A major focus is to monitor changes in the proportion of recent (7 years or less) doctorates among S/E faculty. This set of periodic surveys, first conducted in 1968, covers selected S/E departments.

survey instrument

The survey collects information on full-time faculty and nonfaculty research doctorates by recency of degree (7 years or less; over 7 years) and by demographic characteristics (gender, age, race/ethnicity, and citizenship status). Information on academic rank, tenure status, and research activities is collected for full-time faculty by recency of degree. Data are also collected on the tenure status of faculty appointments and departures. Qualitative data are collected regarding the perceptions of the optimal proportion of recent doctorate faculty, and ability to recruit. Some data are available on the number and academic rank of part-time faculty, nonfaculty research doctorates, and faculty with non-U.S. baccalaureate degrees.

sample design

The 1986 survey universe includes departments representing 21 S/E fields at institutions that awarded at least one S/E doctoral degree in 1981-82 and received at least $2.15 million in Federal research and development (R&D) funds in 1983. In total, 2,024 departments were surveyed in engineering (aeronautical, chemical, civil, electrical, mechanical, industrial) and the sciences (chemistry, geosciences, physics, biology and the biosciences, botany, zoology, biochemistry, microbiology, physiology, mathematics, computer science, economics, political science, sociology, and psychology.)

data availability

Four surveys have been conducted in 1968, 1974, 1980, and 1986. Each employs the same criteria to define the population universe of institutions. Field coverage has increased over the years. The 1968 survey included fields of chemical and electrical engineering, chemistry, physics, mathematics, biochemistry, biology, microbiology, physiology, psychology, economics, and sociology. Geosciences, botany, and zoology were added to the survey in 1974; civil and mechanical engineering and political and computer sciences in 1980; and aeronautical and industrial engineering in 1986. The usefulness of 1968 data are limited due to low response rates for some S/E fields.

Data elements have changed over time in recognition of increasing data needs. Information on number of recent doctorates and level of research activity have been collected since 1968. Additional data on tenure status were collected in 1974; data on rank were added in 1980. Items on demographic characteristics of faculty, departures and appointments, and research proposal submissions were added to the surveys in 1980. The 1986 survey introduced items on vacancies, part-time faculty, and foreign citizenship for full-time faculty and nonfaculty doctorates as well as the rank of faculty with foreign baccalaureate degrees.

data access

Diskettes containing data from the 1974, 1980, and 1986 surveys will be made available. For further information regarding data availability and contents, please contact:

Ms. Christina Crowell-Wise
Division of Science Resources Studies
Science and Engineering Education Sector Studies Group
National Science Foundation
1800 G Street, N.W., Room L611
Washington, D.C. 20550
(202) 634-4787

OMB No. 3145-0091
Approval Expires 04/30/88

RESEARCH PARTICIPATION AND CHARACTERISTICS OF SCIENCE AND ENGINEERING FACULTY
1985-1986

Sponsored by the National Science Foundation
Directorate for Scientific, Technological, and International Affairs
Division of Science Resources Studies

under the authorization of Section 3(a)(6),
NSF Act of 1950, as amended

Please complete the following information:

Department Name ______________________________

Current Date ______________________________

SURVEY RESPONDENT NAME, TITLE, ADDRESS, AND TELEPHONE NUMBER

(Please complete/correct the mailing label below)

INFORMATION GATHERED IN THIS SURVEY WILL BE USED ONLY FOR DEVELOPING STATISTICAL SUMMARIES. INDIVIDUAL PERSONS AND DEPARTMENTS WILL NOT BE IDENTIFIED IN PUBLISHED SUMMARIES OF THE DATA. YOUR PARTICIPATION IN THIS SURVEY IS VOLUNTARY.

PLEASE RETURN THE COMPLETED QUESTIONNAIRE BY FEBRUARY 10, 1986

QUESTIONS 1 - 15 REQUEST INFORMATION ABOUT THIS DEPARTMENT'S FACULTY AND RESEARCH STAFF, TENURE POLICIES, APPOINTMENTS AND DEPARTURES

1. NUMBER OF FULL-TIME FACULTY IN ACADEMIC YEAR 1985-86

Persons with a full-time employment appointment for at least 8 months of the calendar year should be reported here. Include all ranks of regularly appointed faculty, from instructor to professor. Please do NOT include the following as full-time faculty: visiting professors, postdoctorates, graduate assistants, or others who are not regular full-time faculty in this department.

Persons with joint appointments who work part of their time in another department should be included here if they work more than half their time in this department; those working less than half time in this department should be included in the other department. If they work half-time in each, please count each person only once, in whichever department the person chooses.

Do not forget to include yourself and full-time members of your department who are on sabbatical leave away from your institution.

Please enter the number of full-time faculty members in each category listed below:

	TENURED			NON-TENURED		
		Doctorates			Doctorates	
Academic Rank	Non-Doctorate (i)	7 Yrs or Less (ii)	Over 7 Yrs (iii)	Non-Doctorate (iv)	7 Yrs or Less (v)	Over 7 Yrs (vi)
a. Professor						
b. Associate Professor						
c. Assistant Professor						
d. Instructor						
e. Other						
f. TOTAL (lines a - e)						
g. How many of the faculty who are non-tenured are on tenure track?						

2. FULL-TIME NON-FACULTY RESEARCH DOCTORATES

Doctoral personnel employed full-time by the department as professional researchers, who are neither faculty nor postdoctorates, should be reported here.

How many full-time, non-faculty research doctorates are employed in your department?

	Number of Full-Time Non-Faculty Research Doctorates	
	7 Yrs or Less (i)	Over 7 Yrs (ii)
a. TOTAL Employed		

3. PROPORTION OF RECENT DOCTORATES

Data are requested separately for two categories of persons who have been awarded doctorates:

Recent Doctorates - those holding doctorates 7 years or less, who received their doctorates in Spring 1978 or later;

Senior Doctorates - those holding doctorates over 7 years, who received their doctorates earlier than Spring 1978.

What is the optimal percentage of full-time doctoral faculty in your department holding the doctorate for 7 years or less?

a. _____% Preferred percentage b. ______ No opinion

4. FULL-TIME FACULTY POSITIONS AS OF FALL 1985

Include all permanent positions for full-time faculty; do not report temporary positions.

If your college has a fixed budget rather than a specific number of positions available, please report the total number of full-time faculty who would be employed if qualified candidates were available for all positions.

a. ______ TOTAL number of filled and unfilled permanent positions

b. ______ Of TOTAL above, how many were unfilled at beginning of Fall 1985?

c. ______ Of TOTAL above, how many have remained unfilled since the beginning of Fall 1984?

5. HIRING OF RECENT DOCTORATES

Besides financial constraints, which factors currently affect the proportion of recent doctorate faculty in your department? Check **ALL** that apply.

a. _______ Number of full-time faculty positions approved by the school, university or department

c. _______ Need to hire recognized senior faculty to initiate research activity in new area(s)

d. _______ Need to hire recognized senior faculty to maintain levels of extramural research support

e. _______ Unavailability of acceptable candidates

f. _______ Other (Please specify) ________________________________

6. NEW APPOINTMENTS OF FULL-TIME FACULTY

How many permanent full-time faculty did your department appoint for service to begin during the current academic year? What was the status of these appointees immediately prior to their joining your department? What tenure status were they given in your department at the time of their appointment?

Status Prior to Joining Your Department	Number of Full-time Faculty Appointed	
	Tenured (i)	Non-Tenured (ii)
a. Full-time graduate student		
b. Postdoctorate		
c. Full-time faculty or staff in another academic institution		
d. Full-time employee in industry		
e. Full-time employee in government		
f. Other or unknown		
g. TOTAL (lines a - f)		

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7. ABILITY TO RECRUIT

Has there been any change within the past five years in the ability of your department to recruit and retain permanent full-time faculty with doctorates?

	DOCTORATE HELD:		
	7 Yrs or Less (i)	Over 7 Yrs (ii)	
a.	_______	_______	Substantial decrease
b.	_______	_______	Slight or moderate decrease
c.	_______	_______	No change
d.	_______	_______	Slight or moderate increase
e.	_______	_______	Substantial increase

If you did not check "a" or "b" in either column, skip Questions 8 and 9 and go straight to Question 10.

8. EFFECT OF DIFFICULTY TO RECRUIT

How has the overall difficulty in recruiting and retaining full-time doctoral faculty affected your department? Check ALL that apply:

a. _______ Reduction in faculty research
b. _______ Increase in teaching loads
c. _______ Greater reliance on graduate teaching assistants/non-doctoral faculty
d. _______ Greater reliance on part-time doctoral faculty or visiting professors
e. _______ Unable to offer courses in certain subjects
f. _______ Other (specify): ______________________________
g. _______ No significant effect as yet

9. EFFECT OF RECRUITING DIFFICULTY ON RESEARCH QUALITY

Do you believe that the quality of research and instruction in your department has decreased because of the difficulty in recruiting or retaining full-time faculty?

	No Effect (i)	**Slight Effect** (ii)	**Great Effect** (iii)
a. Research	______	______	______
b. Instruction	______	______	______

10. TENURE POLICIES

Since 1980, has your department or institution implemented any of the following changes in tenure or appointment policies or practices? Check ALL that apply:

a. _______ Announced quotas on number or percentage of tenured faculty

b. _______ Lengthened probationary period before tenure decision must be made

c. _______ Replaced tenure with fixed-term contract for some positions

d. _______ Offered optional early retirement

e. _______ Changed mandatory retirement age (from _____ to _____)

f. _______ Other actions designed to change the numbers of faculty by rank, or having that effect; please specify:

____

____

g. _______ None

11. DEPARTURES

How many members of this department who held full-time faculty appointments in September 1984 left the department during the 12-month period ending August 31, 1985 for one of the reasons listed below?

Reason for Leaving	Number of Full-time Faculty Leaving	
	Tenured (i)	Non-Tenured (ii)
a. Illness or death		
b. Voluntary resignation for another academic position		
c. Voluntary resignation for non-academic position in industry		
d. Voluntary resignation for non-academic position in other enterprise		
e. Voluntary resignation for other reasons		
f. Failure to receive tenure		
g. Involuntary resignation for other reasons		
h. TOTAL (lines a - g)		

12. COMPETITION WITH BUSINESS AND INDUSTRY

How has your department's competition with business and industry to recruit and retain permanent full-time faculty changed over the past five years? Competition has:

a. _____ DECREASED (Go to Question 14)
b. _____ NOT CHANGED (Go to Question 14)
c. _____ INCREASED (Go to Question 13)

13. REASON FOR INCREASED COMPETITION

What is the chief reason for increased competition? Check ONLY one:

a. ______ Salaries/financial benefits in industry perceived as superior
b. ______ Industry employment security perceived as better
c. ______ Concentration upon research free from teaching demands
d. ______ Perceived opportunities for advancement and recognition
e. ______ Industry perceived to provide better laboratory equipment
f. ______ Fewer new doctorates have graduated in recent years
g. ______ Other (specify): ______________________________

14. PART-TIME FACULTY

Report persons appointed for less than your institution's typical full-time teaching, research/administrative load, including faculty hired to teach individual courses, when compensation is determined on the basis of the numbers of courses/sections. If part-time faculty are not designated by rank, please enter totals only.

Please enter the number of people for each category shown. If part-time faculty are not designated by rank, please enter members on the total line only.

Academic Rank	Non-Doctorates (i)	Doctorates	
		Recent: 7 Years or Less (ii)	Senior: Over 7 Years (iii)
a. Professor			
b. Associate Professor			
c. Assistant Professor			
d. Instructor			
e. Other			
f. TOTAL (Lines a - e)			

15. PART-TIME RESEARCH DOCTORATES

How many part-time, non-faculty research doctorates are employed in the department? Please enter number of people for each category shown.

	Number of Part-Time Non-Faculty Research Doctorates	
	Recent: 7 Yrs or Less (i)	Senior: Over 7 Yrs (ii)
a. TOTAL Employed		

QUESTIONS 16 - 20 REQUEST INFORMATION ABOUT THIS DEPARTMENT'S PARTICIPATION IN RESEARCH ACTIVITIES

Research participation concerns time spent on all research activities, including preparation of research reports, publications, and applications for funding, as well as other aspects of research; also include supervision of graduate student research.

16. RESEARCH PROPOSALS

How many research proposals were submitted by members of this department to any source of support during the year July 1 1984 to June 30, 1985? What has been the disposition of these proposals up to the present time? Enter **each** proposal in the table below according to the characteristics of its principal investigator and its disposition. If a proposal was submitted to more than one source, count it **only once**. For this question, those holding doctorates for 7 years or less are those receiving the degree since Spring 1978.

Research Proposal Status	Full-Time Faculty			Full-Time Non-Faculty Research Doctorates	
		Doctorates			
	Non-Doctorate (i)	Recent: 7 Yrs or Less (ii)	Senior: Over 7 Yrs (iii)	Recent: 7 Yrs or Less (iv)	Senior: Over 7 Yrs (v)
a. Number funded					
b. Number denied					
c. Number pending					
d. TOTAL submitted (lines a - c)					

17. PROPOSAL APPLICATIONS BY RECENT DOCTORATES

Have faculty members holding their doctorates for 7 years or less been more or less likely to submit applications for independent research support during the 12-month period ending with the current quarter or semester than were faculty members with similar degree status five years ago? Please circle the appropriate number below.

	Very Much Less Likely (i)	Much Less (ii)	A Little Less (iii)	As Likely (iv)	A Little More (v)	Much More (vi)	Very Much More Likely (vii)
a.	1	2	3	4	5	6	7

18. APPROPRIATE DIVISION OF RESEARCH FUNDS

In your opinion, is the current division of research funds between full-time senior and recent doctoral faculty appropriate?

a. _____ Yes
b. _____ No, **recent** doctoral faculty should receive a higher percentage
c. _____ No, **senior** doctoral faculty should receive a higher percentage

19. PARTICIPATION IN INDUSTRIAL, INDEPENDENT OR GOVERNMENT LABORATORIES

How many full-time faculty participated on a released-time basis (include summers) in research projects at these facilities during the last 12 months? Please enter the number of people for **each** category. Exclude those who served only as consultants.

Facility	Number of Full-Time Faculty		
		Doctorates	
	Non-Doctorates (i)	Recent: 7 Years or Less (ii)	Senior: Over 7 Years (iii)
a. Research project in an industrial laboratory			
b. Research project in Federal government laboratory			
c. Research project in state or other government-sponsored lab			
d. Research project in an independently organized lab NOT already counted in "a","b," or "c" above			

QUESTIONS 20 - 23 REQUEST DEMOGRAPHIC INFORMATION ABOUT THE FULL-TIME FACULTY AND STAFF OF YOUR DEPARTMENT

20. AGE

How many full-time faculty are in each of the following age groups?

Age Range	Number of Full-Time Faculty		Number of Full-Time Non-Faculty Research Doctorates (iii)
	Non-Doctorate (i)	Doctorate (ii)	
a. Under 30			
b. 30-34			
c. 35-39			
d. 40-44			
e. 45-49			
f. 50-54			
g. 55-59			
h. 60-64			
i. 65-69			
j. 70 and Over			
k. TOTAL* (lines a - j)			

***Totals on this line should be the SAME as for Questions 1 and 2.**

21. GENDER

How many members of your department are men and how many are women?

	Number of Full-Time Faculty			Number of Full-Time Non-Faculty Research Doctorates	
	Non-Doctorates (i)	Doctorates		Recent: 7 Years or Less (iv)	Senior: Over 7 Years (v)
		Recent: 7 Yrs or Less (ii)	Senior: Over 7 Yrs (iii)		
a. Men					
b. Women					

Sum of Lines "a" and "b" should be the SAME as Totals for Questions 1 and 2.

22. RACE/ETHNICITY AND CITIZENSHIP STATUS

Please indicate the number of department members belonging to each of the following groups, as defined below.

American Indian or Alaskan Native - a person with origins in any of the original peoples of North America, maintaining cultural identification through tribal affiliation or community recognition

Asian or Pacific Islander - a person with origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or Pacific Islands

Black - a person with origins in any of the black racial groups of Africa

White - a person with origins in any of the original peoples of Europe, North Africa, or the Middle East

Hispanic - a person of Mexican, Cuban, Puerto Rican, Central or South American, or other Spanish culture or origin, regardless of race

Foreign:
1. Nonresident Aliens on Temporary Visa - non-U.S. citizens who do not have the right to remain in this country indefinitely;
2. Nonresident Aliens on Permanent Visa - non-U.S. citizens lawfully admitted for permanent residence in the U.S. (holding alien registration receipt cards--Form I-551/155). Include U.S. citizenship applicants.

	Number of Full-Time Faculty			Number of Full-Time Non-Faculty Research Doctorates		
		Doctorates				
Racial/ Ethnic Group	Non-Doctorates (i)	Recent: 7 Yrs or Less (ii)	Senior: Over 7 Yrs (iii)	Recent: 7 Yrs or Less (iv)	Senior: Over 7 Yrs (v)	TOTALS (vi)
a Amer. Indian/ Alaska Native						
b Asian or Pacific Islander						
c Black						
d White						
e TOTAL* (lines a - d)						
f Of TOTAL in Line e, how many of Hispanic ethnic heritage?						
Of TOTAL in Line e, how many are: g Foreign on Permanent Visa						
h Foreign on Temporary Visa						

*Totals on Line e should be the SAME as for Questions 2 and 13.

23. NON-U.S. BACCALAUREATES

Of the faculty in permanent positions in your department, how many did **NOT** receive their bachelor's degree in the United States?

Rank	Bachelor's Received in Foreign Country (i)
a. Professor	
b. Associate Professor	
c. Assistant Professor	
d. Instructor	
e. Other	

24. ADDITIONAL COMMENTS

Please use this space to clarify any of your responses or to comment about the situation of doctorate faculty or researchers, conditions of research support, problems of non-tenured faculty, or any other aspect of this survey.

scientific and technical personnel in private industry

purpose and background

Data on the employment of scientific and technical personnel in private industry are compiled from the Bureau of Labor Statistics (BLS) Occupational Employment Statistics Survey (OES). The National Science Foundation (NSF) supports activities related to this survey to compile national estimates of employment of scientists, engineers, and support technicians by detailed industry. Industry is the largest employer of science and engineering (S/E) personnel. These data are essential to policy analysts monitoring current industrial utilization patterns and are important as a basis for projecting future levels of demand.

survey instrument

Survey forms for the OES are completed by personnel offices of establishments which are categorized by 4-digit Standard Industrial Classification (SIC) codes. The survey collects information on employment in over 650 occupations that are based on two classifications systems—the Dictionary of Occupational Titles (DOT) and the Standard Occupational Classification System (SOC). Included among these occupations are 60 science, engineering, and related S/E-support technician occupations. Each surveyed industry receives a specialized questionnaire in which the level of occupational detail is limited to those job classifications that are essential to its particular staffing pattern.

sample design

The OES survey is a cooperative Federal-State data collection program administered through State Employment Security Agencies in 50 States and the District of Columbia. A three-year survey cycle is needed to cover the entire industrial sector. Information on manufacturing industries (SIC codes 20-39) is collected in the first year of the cycle; data on nonmanufacturing industries, e.g., mining, construction, financial, and service industries (SIC codes 10-17, 60-67, 70, 72-73, 75-76, 78-81, 83-84, 86, 89) are collected in the second year; and data on nonmanufacturing trade and regulated industries (SIC codes 41-42, 44-59) are collected in the third year.

The survey is based on a probability sample of establishments with a sampling frame drawn from units reporting to State Unemployment Insurance (U.I.) systems. The survey universe is stratified by industry and size of establishment. Nine size-classes are represented based on numbers of people employed: 1-3, 4-9, 10-19, 20-49, 50-99, 100-249, 250-499, 500-999, and 1,000 and over. Because U.I. reporting units with 1-3 units were not sampled in every State, establishments with 4-9 employees receive larger weights to represent employment in the smaller units. Reporting units with 1,250 or more employees are included in the sample with certainty.

Surveys of the manufacturing sector have a sample size of roughly 120,000 establishments; both nonmanufacturing sector surveys are based on roughly 225,000 establishments. The survey response rates are approximately 75 percent in terms of units and 67 percent based on weighted counts of employment.

data availability

The first OES Survey of manufacturing industries was conducted in 1977; selected nonmanufacturing industries were surveyed in 1978; and nonmanufacturing trade and regulated industries were surveyed in 1979. The cycle is repeated for subsequent years. The survey is dynamic, with occupational detail within industries refined as additional information on their staffing patterns become available.

Data from the three survey waves are aggregated biennially by the BLS Office of Economic Growth and Employment Projections to develop the OES Industry-Occupation Matrix which is used in conjunction with macroeconomic models to develop employment projections.

Data similar, but not strictly comparable, to those generated by the OES

Survey are available from NSF for 1975 and 1950-70. The 1975 estimates were made by the Bureau of the Census from a sample of 27,000 establishments. Data for 1950-70 were collected by BLS using intermittent direct surveys of establishments, with interpolations used to generate data for intervening years.

data access

Summary statistical tables on employment in scientific, engineering, and technician occupations are available on diskettes prepared for use on an IBM-compatible microprocessor. Inquiries regarding survey content and diskette availability should be addressed to:

Mr. Joseph Gannon
Division of Science Resources
Studies
Industry Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L611
Washington, D.C. 20550
(202) 634-4648

Magnetic tapes containing data by detailed industry crossed by detailed occupation are available from the Bureau of Labor Statistics. Inquiries about tape availability and cost should be addressed to:

Mr. Glyn Finley
Occupational Employment
and Administrative Statistics
Bureau of Labor Statistics
441 G Street, N.W., Rm. 2913
Washington, D.C. 20212
(202) 523-1949

Occupational Report 636-0 **in Cooperation w**

The information collected on this form by the Bureau of Labor Statistics and the State agencies cooperating in its statistical programs will be held in confidence and will be used for statistical purposes only

OCCUPATIONAL EMPLOYMENT SURVEY OF THE ELECTRIC AND ELECTRON

INSTRUCTIONS–PLEASE COMPLETE SECTIONS I thru V–This form requests info
information is required

SECTION I – COVERAGE

a. PRODUCT OR SERVICE: According to our records, your products or services are
related to those listed on the label below.

If this list is not generally appropriate, please specify below and continue to item b

c. SURVEY PERIOD: Pay period including June 12, 1986

Please report for the pay period which includes this date. If, because of ***unusual*** operational pr
Seasonal and general economic changes in employment should ***not*** be considered an unusual op

If the unit(s) did not operate under your management during the survey period, annotate belov
☐ Out of Business ☐ Sold or Merged New name & address ←

d. UNIT EMPLOYMENT: Include all covered employees, as defined below

COVERED EMPLOYEES: Full or part time paid workers, Workers on ***paid*** vacations or ot
duty). Salaried officers, executives and staff of incorporated firms. Employees temporar
whether this unit prepares their pay check.

NON-COVERED EMPLOYEES: Proprietors, owners and partners of unincorporated firms
workers on long term layoff

e. IF QUESTIONS ARISE CONCERNING YOUR REPORT, WHOM SHOULD WE CONTACT?

Name Title

BLS-2877 636-0

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in Cooperation with the **U.S. Department of Labor**

and
ence

This report is authorized by law, 29 U.S.C. 882. Your voluntary cooperation is needed to make the results of this survey comprehensive, accurate, and timely.

Form Approved
O.M.B. No. 1220-0042
Approval expires 4-30-87

AND ELECTRONIC EQUIPMENT INDUSTRIES

form requests information on the number of workers you employ by occupation--No wage or accounting
mation is required

cts or services are

ontinue to item b.

____

____

____

____

b. UNIT(S) COVERED

Please report only for the unit(s) identified by the words "report for," on the label below. Our estimate of the unit(s) employment is in the lower right corner of the label. If this employment represents more than one location, how many? ______

Some employers may receive more than one form and are asked to report separately for each unit(s) covered by the individual forms.

Office Use Only
Status
Auxiliary

(Please change address if incorrect)

(Employment)

____

usual operational problems, this period is not typical, choose a period that approximates the norm and specify → ______________
sidered an unusual operational problem

eriod, annotate below
ame & address → ____

d below. ______________

paid vacations or other types of leave; Workers on ***unpaid*** short term absences (i.e., illness, bad weather, temporary layoff, jury
Employees temporarily assigned to other units; Employees for whom this unit is their permanent (home) duty station, regardless of

unincorporated firms; Unpaid family workers; Workers on extended leave (i.e., pensioners and members of the armed forces) and

LD WE CONTACT?

Title	**City & State**	**Area Code**	**Telephone**	**Date**

SECTION II: UNIT(S) STATUS

a. **TYPE OF OWNERSHIP** ***(Please check one of the following)***

☐ Corporation ☐ Partnership ☐ Sole Proprietorship ☐

b. **AUXILIARY STATUS** Is the Unit ***primarily*** engaged in performing services for ***other*** units of your

☐ Central administrative office ☐ Research, development, or testing lab ☐ Storage

c. **RESEARCH AND DEVELOPMENT EMPLOYMENT** If this unit(s) has any employees engaged in

SECTION III: DEFINITIONS AND SPECIAL INSTRUCTIONS

Report multiple job holders only once: Report an employee who performs work in two or more of the listed occupations in the job that you believe requires the ***highest level of skill.*** If there is no measureable difference in skill requirements, report the employee in the occupation in which he spends most of his time.

Report employees in the occupation in which they are working, not in an occupation for which they may have been trained, if that is different. For example, an employee trained as an Engineer but working as a Drafter, should be reported as a Drafter.

Report part-time workers, learners, and apprentices in the occupation in which they ordinarily perform their work.

Report skilled trade helpers in the Helpers, Laborers, and Material Movers category.

SECTION IV: REPORT EMPLOYMENT BY OCCUPATION

Report all covered employees in one of the listed occupations that follow. Use the "All ployment figures are not available, reasonable estimates may be given

Research and Development workers, in addition to being included in the unshaded area,

Please classify workers according to the definitions provided rather than by title alone.

INDEX TO MAJOR OCCUPATIO

	Page
Managerial and Administrative	3
Professional, Paraprofessional, and Technical	4
Sales and Related	10
Clerical and Administrative Support	10

orship ☐ Other *(explain)* → ______________________________

other units of your company? ☐ Yes ☐ No If yes, please check block below:

lab ☐ Storage *(warehouse)* ☐ Other *(specify, e.g., powerplant)* → ______________________________

nployees engaged in research and development as defined below, enter total number of employees engaged in R&D. → ______

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vers category.

Research and Development: Include in this function employees who spend the greatest proportion of their time performing, managing, or administering basic and applied research in engineering, mathematics, physical, life (including medicine), and other sciences; and in the design and development of prototypes and processes. For purposes of this study, research and development *includes* the following types of activities: (a) Pursuit of planned research of new knowledge, whether or not the research has reference to a specific application. (b) Application of existing knowledge to problems involved in the creation of a new product or process, including work required to evaluate possible uses. (c) Application of existing knowledge to problems involved in the improvement of an existing product or process.

ow. Use the "All Other" categories only when there is no appropriate occupation described. If accurate em-

he unshaded area, should be separately reported in the shaded area provided.

n by title alone.

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OR OCCUPATIONAL DIVISIONS IN SECTION IV

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EMPLOYMENT BY OCCUPATION

Occupations Please report number of your employees by occupation.	**Number of Employees**	**Office Code**
MANAGERIAL AND ADMINISTRATIVE OCCUPATIONS **Include in this division top and middle-level managers, administrators, and executives. Primary duties are policy making, planning, staffing, directing or controlling the activities of industrial, commercial, governmental or other establishments.......... *Organization of this section* - Occupations in this section are ordered functionally as follows: Staff and administrative managerial; industry specific managerial; and a residual "All Other" category ....*Special instructions* - *Exclude* first-line supervisors and managers with first-line duties. These workers, if professional, paraprofessional or technical, should be reported with the workers they supervise. All other supervisors and manager/supervisors should be reported in the separate categories provided in each division. *Exclude* owners and partners of unincorporated firms. *Include* only managers and administrators who are exempt from the minimum wage and overtime provision of the Fair Labor Standards Act.**		
● *SELECTED STAFF AND ADMINISTRATIVE SPECIALTY MANAGERIAL OCCUPATIONS*		
FINANCIAL MANAGERS (TREASURERS; CONTROLLERS; ETC.): Plan, organize, direct, control, or coordinate the financial activities of an organization. Include managers in banks or similar financial institutions who advise on credit and investment policy or negotiate general policy with financial or other institutions.		**130023**
PERSONNEL, TRAINING, AND LABOR RELATIONS MANAGERS (INDUSTRIAL RELATIONS DIRECTORS; BENEFITS DIRECTORS; ETC.): Plan, organize, direct, control, or coordinate the personnel, training or labor relations activities of an organization. Work involves establishing employer-relations policies; directing the selection, training, and evaluation of employees; administering benefits, safety, and recreation programs; developing wage and salary schedules; coordinating bargaining activities; and advising on labor contract administration.		**130053**
PURCHASING MANAGERS (PROCUREMENT MANAGERS; ETC.): Plan, organize, direct, control, or coordinate the activities of buyers, purchasing officers, and related workers involved in purchasing materials, products, or services. Include wholesale or retail trade merchandising managers.		**130083**
MARKETING, ADVERTISING, AND PUBLIC RELATIONS MANAGERS (PROMOTION MANAGERS; SALES MANAGERS; ETC.): Formulate marketing policies, direct sales activities, and plan, organize, and direct advertising and public relations activities for a department, an entire organization, or on an account basis.		**130113**
ADMINISTRATIVE SERVICES MANAGERS (CONTRACT ADMINISTRATORS; ETC.): Plan, organize, direct, control, or coordinate the supportive services department of businesses, agencies, and organizations. Typical Administrative Service Managers are Property Managers and Contract Administrators. Managers who spend less than 80% of their time in administrative services should be classified in another appropriate managerial category. *Exclude* Procurement Managers.		**130143**
ENGINEERING, MATHEMATICAL, AND NATURAL SCIENCES MANAGERS (DATA PROCESSING MANAGERS; PROGRAMMING MANAGERS; ETC.): Plan, organize, direct or coordinate activities in such fields as architecture, electronic data processing, engineering, life sciences, physical sciences, statistics and systems analysis. These persons spend the greatest portion of their time in managerial work for which a background consistent with that described for engineers, mathematicians or natural scientists is required.	R&D + Non R&D =	**130173**
	R&D Only	**130175**

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EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
● *OTHER MANAGERIAL AND ADMINISTRATIVE OCCUPATIONS*		
INDUSTRIAL PRODUCTION MANAGERS (QUALITY CONTROL MANAGERS; ETC.): Plan, organize, direct, control, or coordinate the operational (line) activities and resources necessary for manufacturing products in accordance with cost, quality, and quantity specifications.	R&D + Non R&D = R&D Only	**150143** **150145**
GENERAL MANAGERS AND TOP EXECUTIVES: Include both top and mid-level managers whose duties and responsibilities are too diverse and general in nature to be classified in any functional or line area of management and administration. These managers generally work through departmental or subordinate executives. *Exclude* managers of smaller establishments who typically engage in the same activities as the workers they supervise and report them in the appropriate category in the other divisions.	R&D + Non R&D = R&D Only	**190053** **190055**
ALL OTHER MANAGERS AND ADMINISTRATORS: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*	R&D + Non R&D = R&D Only	**199993** **199995**

PROFESSIONAL, PARAPROFESSIONAL, AND TECHNICAL OCCUPATIONS

Include in this division persons concerned with the theoretical or practical aspects of such fields as science, art, education, law and business relations where substantial post-secondary educational preparation, or equivalent on-the-job training or experience is required.......... *Organization of this section* - Occupations in this section are ordered functionally as follows: General management support; engineering and scientific; data processing and mathematical; social science, law and related; teaching and related; medicine and health; writing, art and related; and a residual "All Other" category.......... *Special instructions* - Quality Control Workers should be reported according to the nature of the quality control process (i.e. chemical, mechanical, biological). Thus, an Engineer engaged in quality control work of a chemical nature should be reported as a Chemical Engineer.......... Unlike the other divisions of this form, first-line supervisors and managers with first-line duties should be reported along with the workers they supervise. Report Administrative Assistants in occupations according to the nature of work they provide (i.e. clerical supportive vs. management supportive).

● *MANAGEMENT SUPPORT OCCUPATIONS*

ACCOUNTANTS, AUDITORS, AND OTHER FINANCIAL SPECIALISTS: Include persons engaged in planning and administering accounting services, advising on tax and accountancy problems, conducting audits, and planning and administering other financial activities, such as budget analysis, mortgage approval, credit and underwriting analysis, and foreign exchange trading.

ACCOUNTANTS AND AUDITORS: Examine, analyze, and interpret accounting records for the purpose of giving advice or preparing statements and installing or advising on systems of recording costs or other financial and budgetary data.		**211143**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
BUDGET ANALYSTS: Examine budget estimates for completeness, accuracy, and conformance with procedures and regulations. Examine requests for budget revisions, recommend approval or denial, and draft correspondence. Analyze monthly department budgeting and accounting reports for the purpose of maintaining expenditure controls. Provide technical assistance to officials in the preparation of budgets.		**211173**
ALL OTHER FINANCIAL SPECIALISTS: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**211993**
PURCHASING AGENTS- EXCEPT WHOLESALE, RETAIL, AND FARM PRODUCTS: Purchase raw or semi-finished materials for manufacturing or purchase machinery, equipment, tools, parts, supplies, or services necessary for the operation of an establishment. Include Contract Specialists, Field Contractors, Purchasers, Price Analysts, Tooling Coordinators, and Media Buyers.		**213083**
PERSONNEL, TRAINING, AND LABOR RELATIONS SPECIALISTS (RECRUITERS; ETC.): Conduct programs of recruitment, selection, placement, training, promotion, welfare, safety, compensation, or separation of employees. May specialize in specific areas such as labor-management relations, counseling, job analysis, position classification, training, or compensation. *Exclude* occupations in personnel research and in the administration of testing and counseling programs for which a background in psychology is required. Also *exclude* Employment Interviewers, Private or Public Employment Service.		**215113**
COST ESTIMATORS: Prepare cost estimates for manufacturing of products, construction projects, or services to aid management in bidding on or determining price of products or services. May specialize according to particular service performed or product produced.		**219023**
ALL OTHER MANAGEMENT SUPPORT WORKERS (MANAGEMENT ANALYSTS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**219993**
● *ENGINEERS AND RELATED OCCUPATIONS*		
ENGINEERS (EXCLUDE SALES ENGINEERS- SEE SALES DIVISION): Include persons engaged in the practical application of physical laws and principles of engineering for the development and utilization of machines, materials, instruments, processes, and services. Include Engineers in research, development, production, technical services, and other positions which require knowledge normally obtained through completion of a 4-year engineering college program. *Exclude* persons trained in engineering but currently working in positions not requiring engineering training.		
METALLURGISTS AND METALLURGICAL, CERAMIC, AND MATERIALS ENGINEERS (METALLOGRAPHERS; EXTRACTIVE OR PHYSICAL METALLURGISTS; ETC.): *Metallurgists and Metallurgical Engineers*: Investigate properties of metals and develop methods to produce new alloys, usages, and processes of extracting metals from their ores. Include Physical and Extractive Metallurgists. *Ceramic Engineers*: Conduct research, design machinery, and develop processing techniques related to the manufacturing of ceramic products. *Materials Engineers*: Evaluate, plan, and implement processes to develop new materials to meet product specifications, performance standards, and costs. *Exclude* Sales Engineers and report them with the Sales Workers.	R&D + Non R&D = R&D Only	**221053** **221055**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
CHEMICAL ENGINEERS (CHEMICAL RESEARCH OR TEST ENGINEERS; ETC.): Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, and paper and pulp, applying principles and technology of chemistry, physics, and engineering. *Exclude* Sales Engineers and report them with the Sales Workers.	R&D + Non R&D = R&D Only	**221143** **221145**
CIVIL ENGINEERS, INCLUDING TRAFFIC (SANITARY ENGINEERS; STRUCTURAL ENGINEERS; HYDRAULIC ENGINEERS; ETC.): Perform a variety of engineering work in planning, designing, and overseeing construction and maintenance of structures and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, water and sewage systems, and waste disposal units. Include Traffic Engineers who specialize in studying vehicular and pedestrian traffic conditions.	R&D + Non R&D = R&D Only	**221213** **221215**
ELECTRICAL AND ELECTRONIC ENGINEERS (ELECTRICAL PRODUCTS AND SYSTEMS ENGINEERS; ELECTRICAL DESIGN ENGINEERS; POWER DISTRIBUTION OR TRANSMISSION ENGINEERS; COMPUTER ENGINEERS; ETC.): Design, develop, test and supervise the manufacture and installation of electrical and electronic equipment, components or systems, computers and related equipment and systems for commercial, industrial, military or scientific use. *Exclude* Sales Engineers and report them with the Sales Workers.	R&D + Non R&D = R&D Only	**221263** **221265**
INDUSTRIAL ENGINEERS, EXCEPT SAFETY (TIME STUDY ENGINEERS; INDUSTRIAL QUALITY CONTROL ENGINEERS; ETC.): Perform a variety of engineering work in planning and overseeing the utilization of production facilities and personnel in department or other subdivision of industrial establishment. Plan equipment layout, workflow, and accident prevention measures to maintain efficient and safe utilization of plant facilities. Plan and oversee work study and training programs to promote efficient worker utilization. Develop and oversee quality control, inventory control, and production record systems. Industrial Product Safety Engineers should be included with Safety Engineers.	R&D + Non R&D = R&D Only	**221283** **221285**
SAFETY ENGINEERS, EXCEPT MINING (INDUSTRIAL HEALTH ENGINEERS; FIRE PROTECTION ENGINEERS; PRODUCT SAFETY ENGINEERS; ETC.): Apply knowledge of industrial processes, mechanics, chemistry, psychology, and industrial health and safety laws to prevent or correct injurious environmental conditions and minimize effects of human traits that create hazards to life and property or reduce worker morale and efficiency. Include Industrial Product Safety Engineers.	R&D + Non R&D = R&D Only	**221323** **221325**
MECHANICAL ENGINEERS (TOOL DESIGN ENGINEERS; FACILITIES OR PRODUCTS MECHANICAL ENGINEERS; PLANT EQUIPMENT ENGINEERS; ETC.): Perform a variety of engineering work in the planning and designing of tools, engines, machines, and other mechanically functioning equipment; and oversee installation, operation, maintenance, and repair of such equipment, including centralized heat, gas, water, and steam systems. *Exclude* Sales Engineers and report them with the Sales Workers.	R&D + Non R&D = R&D Only	**221353** **221355**
ALL OTHER ENGINEERS (OPTICAL ENGINEERS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*	R&D + Non R&D = R&D Only	**221993** **221995**
ENGINEERING AND RELATED TECHNICIANS AND TECHNOLOGISTS: Include persons who assist Engineers, Architects, or Surveying and Mapping Scientists in laboratory or production activities, such as research, development, equipment or machine design, testing, quality control, and efficiency studies. Normally these technicians work under the general supervision of an Engineer, Architect, or Surveying and Mapping Scientists, utilizing basic knowledge of principles and techniques in specific areas of engineering, science, mathematics, drafting, and surveying and mapping. Repair Technicians whose work is primarily maintenance and not developmental are *excluded* and should be reported with Mechanics and Repairers.		

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EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
CIVIL ENGINEERING TECHNICIANS AND TECHNOLOGISTS: Apply theory and principles of civil engineering in planning, designing, and overseeing construction and maintenance of structures and facilities under the direction of engineering staff and physical scientists.	R&D + Non R&D = R&D Only	**225023** **225025**
ELECTRICAL AND ELECTRONIC ENGINEERING TECHNICIANS AND TECHNOLOGISTS (RESEARCH INSTRUMENTATION TECHNICIANS; SEMICONDUCTOR DEVELOPMENT TECHNICIANS; ETC.): Apply electrical and electronic theory and related knowledge to design, build, test, repair, and modify developmental, experimental, or production electrical equipment in industrial or commercial plants and for subsequent use by engineering personnel in making engineering design and evaluation decisions.	R&D + Non R&D = R&D Only	**225053** **225055**
INDUSTRIAL ENGINEERING TECHNICIANS AND TECHNOLOGISTS (TIME STUDY TECHNICIANS; ETC.): Study and record time, motion, method, and speed involved in performance of production, maintenance, clerical, and other worker operations for such purposes as establishing standard production rates or improving efficiency. Usually work under the direction of engineering staff.	R&D + Non R&D = R&D Only	**225083** **225085**
MECHANICAL ENGINEERING TECHNICIANS AND TECHNOLOGISTS (OPTOMECHANICAL TECHNICIANS; HEAT TRANSFER TECHNICIANS; TOOL OR DIE DRAWING CHECKERS; ETC.): Apply theory and principles of mechanical engineering to develop and test machinery and equipment under direction of engineering staff and physical scientists.	R&D + Non R&D = R&D Only	**225113** **225115**
DRAFTERS (CHIEF DRAFTERS; DETAIL DRAFTERS; STRUCTURAL DRAFTERS; MECHANICAL DRAFTERS; ETC.): Prepare clear, complete, and accurate working plans and detail drawings from rough or detailed sketches or notes for engineering or manufacturing purposes according to specified dimensions. Utilize knowledge of various machines, engineering practices, mathematics, building materials, and other physical sciences to complete drawings.	R&D + Non R&D = R&D Only	**225143** **225145**
ALL OTHER ENGINEERING AND RELATED TECHNICIANS AND TECHNOLOGISTS (METALLURGICAL TECHNICIANS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*	R&D + Non R&D = R&D Only	**225993** **225995**
● *NATURAL SCIENTISTS AND RELATED WORKERS*		
PHYSICAL SCIENTISTS: Include persons engaged in research, development, production, or providing technical services pertaining to the physical universe (i.e. Geologists, Chemists, Physicists, etc.). Work may focus on increasing the basic knowledge of the physical universe or the application of these scientific principles and theories to specific problems and situations. Physical Scientists are engaged in scientific work which requires knowledge normally obtained by completion of a 4-year physical sciences college program. *Exclude* Biophysicists and Biochemists and report them with Life Scientists.		
PHYSICISTS AND ASTRONOMERS (MOLECULAR PHYSICISTS; THERMODYNAMIC PHYSICISTS; ETC.; EXCLUDE BIOPHYSICISTS): *Physicists*: Conduct research into the phases of physical phenomena; develop theories and laws on the basis of observation and experiments; and devise methods to apply laws and theories to industry and other fields. *Astronomers*: Observe, interpret, and research celestial and astronomical phenomena to increase basic knowledge and apply such information to practical problems. *Exclude* Biophysicists.	R&D + Non R&D = R&D Only	**241023** **241025**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
CHEMISTS, EXCEPT BIOCHEMISTS (ANALYTICAL CHEMISTS; PHYSICAL CHEMISTS; POLLUTION CONTROL CHEMISTS; ETC.): Conduct chemical tests, qualitative and quantitative chemical analyses, or chemical experiments in laboratories for quality or process control or to develop new products or new knowledge. *Exclude* Biochemists.	R&D + Non R&D = R&D Only	241053 241055
ALL OTHER PHYSICAL SCIENTISTS (ENVIRONMENTAL SCIENTISTS; WATER QUALITY ANALYSTS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*	R&D + Non R&D = R&D Only	241993 241995
LIFE SCIENTISTS: Include persons engaged in research, development, production, or providing technical services pertaining to the life sciences (i.e. Agricultural, Biological, Medical Scientists, etc.). Work may focus on increasing the basic knowledge of life sciences or the application of these scientific principles and theories to specific problems and situations. Life Scientists engage in scientific work which requires knowledge normally obtained by completion of a 4-year life sciences college program. Include Biophysicists and Biochemists.	R&D + Non R&D = R&D Only	243003 243005
PHYSICAL AND LIFE SCIENCE TECHNICIANS AND TECHNOLOGISTS: Include persons who assist physical and life scientists in laboratory and production activities, such as laboratory analysis; quality control; design and maintenance of special apparatus, plant, and equipment; and developing industrial processes. Normally these technicians work under the direct supervision of a Physical or Life Scientist and assist in those activities which are more routine in nature. *Exclude* Medical and Dental Technicians and Technologists.		
CHEMICAL TECHNICIANS AND TECHNOLOGISTS, EXCEPT HEALTH (CHEMICAL LABORATORY TESTERS; ETC.): Conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for purposes such as research and development of new products or processes, quality control, maintenance of environmental standards, and other work involving experimental, theoretical, or practical application of chemistry and related sciences.	R&D + Non R&D = R&D Only	245053 245055
ALL OTHER PHYSICAL AND LIFE SCIENCE TECHNICIANS AND TECHNOLOGISTS (AIR ANALYSIS TECHNICIANS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*	R&D + Non R&D = R&D Only	245993 245995
● *COMPUTER, MATHEMATICAL, OPERATIONS RESEARCH, AND RELATED OCCUPATIONS*		
SYSTEMS ANALYSTS, ELECTRONIC DATA PROCESSING (PROGRAMMER ANALYSTS; SOFTWARE SYSTEMS ANALYSTS; INFORMATION SCIENTISTS; ETC.): Analyze business, scientific, and technical problems for application to electronic data processing systems. *Exclude* persons working primarily as Engineers, Mathematicians, or Scientists.	R&D + Non R&D = R&D Only	251023 251025
COMPUTER PROGRAMMERS (BUSINESS, SCIENTIFIC, OR ENGINEERING PROGRAMMERS; ETC.): Convert symbolic statements of administrative data, business, scientific, engineering, and other technical problem formulations to detailed logical flow chart for coding into computer language; develop and write computer programs to store, locate, and retrieve specific documents, data, and information.	R&D + Non R&D = R&D Only	251053 251055
COMPUTER PROGRAMMER AIDES (PROGRAM CODERS; ETC.): Assist Computer Programmers or Systems Analysts by performing computer related tasks, such as entering completed programs for conversion to machine instructions, writing simple programs to retrieve data, and other duties to assist in the processing of data or to control industrial processes.		251083

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
PROGRAMMERS- NUMERICAL, TOOL, AND PROCESS CONTROL: Develop numerical control tape programs to control machining or processing of parts by automatic machine tools, equipment or systems.		251113
OPERATIONS AND SYSTEMS RESEARCHERS AND ANALYSTS, EXCEPT COMPUTER: Conduct analyses of management and operational problems in terms of management information and concepts. Formulate mathematical or simulation models of the problem for solution by computers or other methods. May develop and supply time and cost networks, such as Program Evaluation and Review Techniques.	R&D + Non R&D =	253023
	R&D Only	253025
MATHEMATICAL SCIENTISTS (STATISTICIANS; MATHEMATICIANS; ETC.): Conduct research in fundamental mathematics and in the application of mathematical techniques to science, management, and other fields and solve or direct solutions to problems in various fields by mathematical methods.	R&D + Non R&D =	253103
	R&D Only	253105
● *OTHER PROFESSIONAL, PARAPROFESSIONAL, AND TECHNICAL OCCUPATIONS*		
LAWYERS (PATENT ATTORNEYS; COUNSELORS-AT-LAW; CORPORATE COUNSEL; ETC.): Conduct criminal and civil lawsuits, draw up legal documents, advise clients as to legal rights, and practice other phases of law. May represent client in court or before quasi-judicial or administrative agencies of government. May specialize in a single area of law such as patent law, corporate law, or criminal law.		281083
HEALTH PRACTITIONERS, TECHNOLOGISTS, TECHNICIANS, AND RELATED HEALTH OCCUPATIONS (PHYSICIANS; NURSES; DIETITIANS; THERAPISTS; ETC.): Include persons concerned with the prevention and diagnosis of human and animal ailments; maintenance and care of illness through nursing care, compounding drugs, nutritional programs, therapy treatment; medical laboratory testing; and medical records technology.		320003
WRITERS AND EDITORS (PUBLICATIONS EDITORS; COPY WRITERS; ETC.): Originate and prepare written material such as scripts, stories, news items, advertisements, and other material. Coordinate, edit, and analyze prepared written material. Include Managing Editors. *Exclude* Publicity Writers, Public Relations Specialists, and Technical Writers.		340023
TECHNICAL WRITERS (PROCESS DESCRIPTION WRITERS; ASSEMBLY INSTRUCTIONS WRITERS; ETC.): Write or edit technical materials, such as equipment manuals, appendices, and operating and maintenance instructions. May oversee preparation of illustrations, photographs, diagrams, and charts and assist in layout work.		340053
DESIGNERS, EXCEPT INTERIOR DESIGNERS (PACKAGE DESIGNERS; ETC.; EXCLUDE ENGINEERS): Design or arrange objects and materials to achieve artistic or decorative affects for apparel or other commercial items. May also create, mark out, or draw designs for items, such as furniture and machinery (product design). Designers are generally categorized according to articles or products designed, such as Clothes Designers, Industrial Designers, or according to type of design work, such as Embroidery Designers. Include Art Directors, Layout Artists, and Creative and Graphic Designers. *Exclude* Detail Designers and Decorators and report them in the Precision Production Occupations category.		340383
ALL OTHER PROFESSIONAL, PARAPROFESSIONAL, AND TECHNICAL WORKERS (PHOTOGRAPHERS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*	R&D + Non R&D =	399993
	R&D Only	399995

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EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
SALES AND RELATED OCCUPATIONS **Include in this division persons selling goods or services and others directly related to sales.......... *Organization of this section* - Occupations in this section are ordered functionally as follows: Supervising; sales of services; commodity sales; and a residual "All Other" category.......... *Special instructions* - Managers of smaller establishments who typically have first-line supervisory duties and engage in the same activities as the workers they supervise should be reported in the First Line Supervisors and Manager/Supervisors occupation.**		
FIRST LINE SUPERVISORS AND MANAGER/SUPERVISORS- SALES AND RELATED OCCUPATIONS (SALES REPRESENTATIVE SUPERVISORS; SALES CLERK SUPERVISORS; ETC.): Directly supervise and coordinate activities of marketing, sales, and related workers. Working proprietors, in addition to their supervisory duties, may perform management functions, such as budgeting, accounting, marketing, and personnel work.		**410023**
SALES ENGINEERS (ELECTRONICS PRODUCTS AND SYSTEMS SALES ENGINEERS; INDUSTRIAL MACHINERY SALES ENGINEERS; ETC.): Sell business goods and services that require a technical background equivalent to a baccalaureate degree in engineering. *Exclude* Engineers whose primary function is not marketing or sales.		**490023**
SALES REPRESENTATIVES, SCIENTIFIC AND RELATED PRODUCTS AND SERVICES- EXCEPT RETAIL (COMMUNICATION EQUIPMENT SALES REPRESENTATIVES; ELECTRONICS SALES REPRESENTATIVES; ETC.): Sell products or services requiring scientific or similar knowledge. This knowledge is in areas such as biology, engineering, chemistry, and electronics, and is normally obtained from 2 or 3 years of post secondary education or its equivalent. Sell products such as aircraft, agricultural equipment and supplies, industrial machinery, medical supplies, electronic equipment, chemicals, and precision instruments. *Exclude* Sales Engineers whose background or equivalent knowledge is equal to a bachelors degree in engineering.		**490053**
SALES REPRESENTATIVES, EXCEPT SCIENTIFIC AND RELATED PRODUCTS OR SERVICES AND RETAIL (SAFETY APPAREL AND EQUIPMENT SALES REPRESENTATIVES; ETC.): Sell goods and services for wholesalers or manufacturers to businesses or groups of individuals. Work requires a substantial knowledge of the items sold. Solicit orders from established clients or secure new customers.		**490083**
ALL OTHER SALES AND RELATED WORKERS (SALES CLERKS; DEMONSTRATORS AND PROMOTERS; ETC.): Include all other workers in this category not classified separately above.		**499993**
CLERICAL AND ADMINISTRATIVE SUPPORT OCCUPATIONS **Include in this division persons performing office and plant clerical tasks, such as typing, filing, computer operating, records keeping (personnel, stock, production, billing, etc.), and mail preparation and distributing.......... *Organization of this section* - Occupations in this section are ordered functionally as follows: Supervising; unique and industry specific (occupations); secretarial and general office; office machine operating; communications and mail distributing; material recording and other production related; and a residual "All Other" category. Report Administrative Assistants in occupations according to the nature of work they provide (i.e. clerical supportive vs. management supportive).**		

10[illegible]

10[illegible]

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
FIRST LINE SUPERVISORS AND MANAGER/SUPERVISORS- CLERICAL AND ADMINISTRATIVE SUPPORT OCCUPATIONS (TYPING SUPERVISORS; BOOKKEEPING CLERK SUPERVISORS; ETC.): Directly supervise and coordinate activities of clerical and administrative support workers. Manager/Supervisors are generally found in smaller establishments where they perform both supervisory and management functions, such as accounting, marketing, and personnel work. In addition, Manager/Supervisors may also engage, in part, in the same clerical work as the workers they supervise.		**510023**
ADJUSTMENT CLERKS (CUSTOMER SERVICE REPRESENTATIVES; CUSTOMER COMPLAINT CLERKS; ETC.): Investigate and resolve customer complaints concerning merchandise, service, billing, or credit rating. Examine pertinent information to determine accuracy of customer complaint and responsibility for errors. Notify customer and appropriate personnel of findings, adjustments, and recommendations, such as exchange of merchandise, refund of money, credit to customer's account, or adjustment of customer's bill.		**531233**
● *SELECTED SECRETARIAL AND GENERAL OFFICE OCCUPATIONS*		
SECRETARIES: Relieve officials of clerical work and minor administrative and business detail by scheduling appointments, giving information to callers, taking dictation, composing and typing routine correspondence (using typewriter or word processor), reading and routing incoming mail, and filing correspondence and other records. May perform various other assigned clerical duties.		**551003**
STENOGRAPHERS (STENOTYPE OPERATORS; ETC.): Take dictation in shorthand of correspondence, reports, and other material and operate typewriter or word processor to transcribe dictated material. Also perform variety of clerical duties, except when working in a stenographic pool. In addition to stenographic duties, may transcribe material from sound recordings.		**553023**
RECEPTIONISTS AND INFORMATION CLERKS (APPOINTMENT CLERKS; ETC.): Answer inquiries and obtain information for general public (customers, visitors, and other interested parties) concerning activities conducted at an establishment, location of offices or persons within firm, departments within store, or services within hotel. May perform variety of other clerical duties. *Exclude* Receptionists who operate switchboards.		**553053**
TYPISTS (CLERK-TYPISTS; ETC.): Type letters, reports, stencils, forms, addresses, or other straight copy material from rough draft, corrected copy, or voice recording. May perform other clerical duties as assigned. Typists using word processing equipment should be reported as Typists, Word Processing.		**553083**
TYPISTS, WORD PROCESSING EQUIPMENT: Use word processing equipment to type letters, forms, or other straight copy material from rough draft, corrected copy, or voice recording. May perform other clerical duties as assigned. Keypunchers are classified as Data Entry Keyers. Secretaries and Stenographers may also use word processing equipment but are *excluded* from this category.		**553113**
PERSONNEL CLERKS, EXCEPT PAYROLL AND TIMEKEEPING: Compile and keep personnel records. Record data for each employee, such as address, weekly earnings, absences, amount of sales or production, supervisory reports on ability, and on date of and reason for termination. Compile and type reports from employment records. File employment records. Search employee files and furnish information to authorized persons.		**553143**
FILE CLERKS: File correspondence, cards, invoices, receipts, and other records in alphabetical or numerical order or according to the filing system used. Locate and remove material from file when requested. May be required to classify and file new material.		**553213**
ORDER CLERKS- MATERIALS, MERCHANDISE, AND SERVICE (TELEPHONE ORDER CLERKS; MAIL ORDER CLERKS; ETC.): Receive and process incoming orders for materials, merchandise, or services such as repairs, installations, or rental of facilities. Additional duties include informing customers of receipt of order, prices, shipping dates, and delays; preparing contracts; and handling complaints. Workers who dispatch as well as take orders for services should be reported as Dispatchers.		**553233**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
PROCUREMENT CLERKS (PURCHASING CLERKS; ETC.): Compile information and records to draw up purchase orders for procurement of material.		553263
STATISTICAL CLERKS (SALES RECORD CLERKS; ETC.): Compile and compute data according to statistical formulas for use in statistical studies. May also perform actuarial computations using algebra and trigonometry and compile charts and graphs for use by Actuaries. Include Actuarial Clerks.		553283
BOOKKEEPING, ACCOUNTING, AND AUDITING CLERKS (BILLING CHECKERS; ETC.): Compute, classify, and record numerical data to keep sets of financial records complete. Perform any combination of routine calculating, posting, and verifying duties to obtain primary financial data for use in maintaining accounting records. May also check the accuracy of figures, calculations, and postings pertaining to business transactions recorded by other workers. Workers whose primary duty is operation of special office machines are classified as Billing, Posting, and Calculating Machine Operators.		553383
PAYROLL AND TIMEKEEPING CLERKS (ATTENDANCE CLERKS; COMMISSION CLERKS; ETC.): Compute wages and post wage data to payroll records and/or keep a daily record showing time of arrival and departure from work of employees. Compute earnings from timesheets and work tickets using calculator. Operate posting machine to compute and subtract deductions. Enter net wages on earnings record card, check stub, and payroll sheet.		553413
BILLING, COST AND RATE CLERKS (MANIFEST CLERKS; ETC.): Compile data, compute fees and charges, and prepare invoices for billing purposes. Duties also include computing costs and calculating rates for goods, services, and shipment of goods; posting data and keeping other relevant records. May involve use of typing, adding, calculating, and bookkeeping machines. Workers whose primary duty is operation of special office machines are classified as Billing, Posting, and Calculating Machine Operators. Workers calculating charges for passenger transportation are classified as Reservation and Transportation Ticket Agents.		553443
GENERAL OFFICE CLERKS: Workers should be classified as General Clerks *only* if their duties are too varied and diverse to be classified in any specific office clerical occupation. Clerical duties may be assigned in accordance with the office procedures of individual establishments and may include a combination of bookkeeping, typing, stenography, office machine operation, and filing.		553473
ELECTRONIC DATA PROCESSING AND OTHER OFFICE MACHINE OCCUPATIONS: Include workers who specialize in the operation of office machines, such as computers, billing machines, copiers, addressing and mailing machines, collators, data key-entry machines, etc. NOTE: Although most office workers operate "office machines" as part of their work, the workers in this category spend the *majority* of their time in machine operation. Typists are *excluded* from this category.		
COMPUTER OPERATORS, EXCEPT PERIPHERAL EQUIPMENT (CONSOLE OPERATORS; ETC.): Monitor and control electronic computer to process business, scientific, engineering, and other data according to operating instructions. *Exclude* operators who control peripheral equipment only.		560113
PERIPHERAL EDP EQUIPMENT OPERATORS (TABULATING MACHINE OPERATORS; ETC.): Operate computer peripheral equipment such as tape or disk drives, printers, card-to-tape or tabulating machines, sorters, or interpreters. *Exclude* Computer Operators and Data Entry Keyers.		560143
DATA ENTRY KEYERS, EXCEPT COMPOSING (KEYPUNCHERS; VERIFIER OPERATORS; ETC.): Operate keypunch or key entry devices to prepare data processing input materials on cards, disk or tape. Duties include machine entry recording, coding, or verifying alphabetic or numeric data.		560173

EMPLOYMENT BY OCCUPATION

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Occupations	Number of Employees	Office Code
ALL OTHER OFFICE MACHINE OPERATORS: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**560993**
SWITCHBOARD OPERATORS (SWITCHBOARD RECEPTIONISTS; PBX OPERATORS; ETC.): Operate cord or cordless switchboard to relay incoming, outgoing, and interoffice calls. May supply information to callers and record messages. In addition to performing duties of Switchboard Operator, may also act as receptionist and perform routine clerical work and typing.		**571023**
MATERIAL RECORDING, SCHEDULING, DISPATCHING, AND DISTRIBUTING OCCUPATIONS: Include persons concerned with dispatching equipment, materials and workers, examining orders for goods and services; receiving, storing, scheduling, issuing, shipping, requisitioning, and accounting for material in store, in use, or in production. Include occupations such as Dispatchers, Production and Planning Clerks, Expeditors, Shipping Clerks, Stock Clerks, Meter Readers, Weighers, Checkers, and Samplers. In manufacturing, these workers are often closely related to clerical functions involved with the production process.		
PRODUCTION, PLANNING, AND EXPEDITING CLERKS (EXPEDITERS; PRODUCTION CONTROL CLERKS; ASSIGNMENT CLERKS; ETC.): Duties are primarily clerical in nature and involve coordinating and expediting the flow of work and materials within or between departments of an establishment according to production schedule. This includes reviewing and distributing production schedules and work orders, conferring with department supervisors to determine progress of work and completion dates, and compiling reports on progress of work and production problems. Duties may also include scheduling workers and estimating costs, routing and delivering parts to insure production quotas are met, and scheduling shipment of parts. May keep inventory of material in departments and insure that merchandise is shipped by vendor on promised date. May write special orders for services and merchandise. Workers whose primary duty concerns weighing, measuring, and checking merchandise, supplies, and equipment are classified as Weighers, Measurers, and Checkers, Recordkeeping. Workers concerned with material expediting of a nonclerical nature are classified in Helpers, Laborers, and Material Handlers.		**580083**
WEIGHERS, MEASURERS, CHECKERS, AND SAMPLERS- RECORDKEEPING: Duties are primarily clerical in nature and involve weighing, measuring, and checking materials, supplies, and equipment for the purpose of keeping relevant records. Also include workers who collect and keep record of samples of products or materials. *Exclude* Production Samplers and Weighers.		**580173**
STOCK CLERKS- STOCKROOM, WAREHOUSE OR STORAGE YARD (STOCKROOM INVENTORY CLERKS; WAREHOUSE RECORD CLERKS; TOOL-CRIB ATTENDANTS; ETC.): Receive, store, and issue materials, equipment, and other items from stockroom, warehouse, or storage yard. Keep records and compile stock reports. *Exclude* Stockroom Laborers and workers whose primary duties involve shipping, weighing, and checking.		**580233**
TRAFFIC, SHIPPING, AND RECEIVING CLERKS (SHIPPING PACKERS; FREIGHT CLERKS; ETC.): Verify and keep records on incoming and outgoing shipments and prepare items for shipment. Duties include assembling, addressing, stamping, and shipping merchandise or material; receiving, unpacking, verifying, and recording incoming merchandise or material; and arranging for the transportation of products. *Exclude* Laborers, Stock Clerks, and workers whose primary duties involve weighing and checking.		**580283**

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EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
ALL OTHER MATERIAL RECORDING, SCHEDULING, AND DISTRIBUTING WORKERS: Include all other workers in this category not classified separately above.		580993
ALL OTHER CLERICAL AND ADMINISTRATIVE SUPPORT WORKERS (MESSENGERS; ETC.): Include all other workers in this category not classified separately above.		599993
SERVICE OCCUPATIONS **Include in this division workers in occupations relating to protective service, food service, health assisting service, cleaning and building service, and personal service..........** ***Organization of this section*** **- Occupations in this section are ordered functionally as follows: Supervising; protective services; food services; health; cleaning; personal services; and a residual "All Other" category.**	5	
FIRST LINE SUPERVISORS AND MANAGER/SUPERVISORS- SERVICE: Include persons who directly supervise and coordinate activities of workers who provide protective services, food services, health assisting services, cleaning and building services, personal services, and other services. Manager/Supervisors are generally found in smaller establishments where they perform both supervisory and management functions, such as accounting, marketing, and personnel work. In addition, Manager/Supervisors may also engage, in part, in the same work as the workers they supervise. *Exclude* work leaders who spend 20% or more of their time at tasks similar to those of employees under their supervision and report them in the occupations which are most closely related to their specific work duties.		610003
GUARDS AND WATCH GUARDS: Stand guard at entrance gate or walk about premises of business or industrial establishment to prevent theft, violence, or infractions of rules; guard property against fire, theft, vandalism, and illegal entry; direct patrons or employees and answer questions relative to services of establishment; control traffic to and from buildings and grounds.		630473
FOOD AND BEVERAGE PREPARATION AND SERVICE OCCUPATIONS: Include occupations concerned with preparing and serving food and beverages. Include occupations such as Cooks, Cafeteria Workers, Waiters and Waitresses, and Kitchen Workers.		650003
CLEANING AND BUILDING SERVICE OCCUPATIONS, EXCEPT PRIVATE HOUSEHOLDS: Include workers who clean and maintain the upkeep of hotels, apartments, buildings, and similar establishments. In commercial establishments these workers may have additional duties such as tending furnaces, routine maintenance, or cleaning sidewalks. Both heavy and light cleaning workers are included. Building Service Workers also operate elevators or perform pest control. Workers whose ***primary*** **duty is repair should be reported in the repair section in the last Division.**		
JANITORS AND CLEANERS, EXCEPT MAIDS AND HOUSEKEEPING CLEANERS: Keep building in clean and orderly condition. Perform heavy cleaning duties, such as operating motor-driven cleaning equipment, mopping floors, washing walls and glass, and removing rubbish. May have additional duties and responsibilities, such as tending furnace and boiler, performing routine maintenance activities, notifying management of need for repairs and additions, and cleaning snow or debris from sidewalk. *Exclude* Maids and Housekeepers.		670053
ALL OTHER CLEANING AND BUILDING SERVICE WORKERS, EXCEPT PRIVATE HOUSEHOLDS (ELEVATOR OPERATORS; ETC.): Include all other workers in this category not classified separately above.		670993

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EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
ALL OTHER SERVICE WORKERS: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**699993**
AGRICULTURAL, FORESTRY, FISHING, AND RELATED OCCUPATIONS **AGRICULTURAL, FORESTRY, FISHING, AND RELATED OCCUPATIONS (GARDENERS AND GROUNDSKEEPERS; ETC.):** Include in this Division workers concerned with agricultural production, forestry, and fishing. Also included in this division are agriculture related workers such as animal caretakers and groundskeepers.		**700003**
PRODUCTION, CONSTRUCTION, OPERATING, MAINTENANCE, AND MATERIAL HANDLING OCCUPATIONS **Include in this Division all skilled, semiskilled, and unskilled workers performing machine and manual tasks involving production, construction, operating, maintenance, repair, and material handling operations.......... *Organization of this section* - Occupations in this section are ordered functionally as follows: Supervising; inspecting; repair; construction; precision production; machine setting, operating, and tending; assembling and hand working; plant and system operation; transportation and material moving equipment operating; and helpers, laboring, and manual material moving.......... *Special instructions* - Because of the differing experience and training required, production workers performing precision tasks (whether hand or machine) are reported separately. In addition, the remaining production worker groups are divided between machine and manual operations. The use of hand held power tools is considered a manual operation for the purpose of this survey.**		
FIRST LINE SUPERVISORS AND MANAGER/SUPERVISORS- MECHANICS, INSTALLERS, AND REPAIRERS: Directly supervise and coordinate activities of mechanics, repairers and installers. May also supervise helpers assigned to these workers. Manager/Supervisors are generally found in smaller establishments where they perform both supervisory and management functions, such as accounting, marketing, and personnel work. In addition, Manager/Supervisors may also engage, in part, in the same repair work as the workers they supervise. *Exclude* work leaders who spend 20% or more of their time at tasks similar to those of employees under their supervision and report them in the occupations which are most closely related to their specific work duties		**810023**
FIRST LINE SUPERVISORS AND MANAGER/SUPERVISORS- PRODUCTION AND OPERATING WORKERS: Directly supervise and coordinate activities of production and operating workers, such as testers, precision workers, machine setters and operators, assemblers, fabricators, or plant and system operators. Manager/Supervisors are generally found in smaller establishments where they perform both supervisory and management functions, such as accounting, marketing, and personnel work. In addition, Manager/Supervisors may also engage, in part, in the same production work as the workers they supervise. *Exclude* work leaders who spend 20% or more of their time at tasks similar to those of employees under their supervision and report them in the occupations which are most closely related to their specific work duties.		**810083**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
FIRST LINE SUPERVISORS AND MANAGER/SUPERVISORS- TRANSPORTATION AND MATERIAL MOVING MACHINE AND VEHICLE OCCUPATIONS: Directly supervise and coordinate activities of transportation and material moving machine operators. May supervise helpers assigned to these workers. Manager/Supervisors are generally found in smaller establishments where they perform both supervisory and management functions, such as accounting, marketing, and personnel work. In addition, Manager/Supervisors may also engage, in part, in the same material moving work as the workers they supervise. *Exclude* work leaders who spend 20% or more of their time at tasks similar to those of employees under their supervision and report them in the occupations which are most closely related to their specific work duties.		810113
FIRST LINE SUPERVISORS AND MANAGER/SUPERVISORS- HELPERS, LABORERS, AND MATERIAL MOVERS, HAND: Directly supervise and coordinate activities of helpers, laborers, or material movers. Manager/Supervisors are generally found in smaller establishments where they perform both supervisory and management functions, such as accounting, marketing, and personnel work. In addition, Manager/Supervisors may also engage, in part, in the same hand labor as the workers they supervise. *Exclude* work leaders who spend 20% or more of their time at tasks similar to those of employees under their supervision and report them in the occupations which are most closely related to their specific work duties.		810173
ALL OTHER FIRST LINE SUPERVISORS AND MANAGER/SUPERVISORS-PRODUCTION, CONSTRUCTION, MAINTENANCE AND RELATED: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		810993
INSPECTORS AND RELATED OCCUPATIONS: Include in this category workers related to this Division who inspect, test, grade, sort, or perform related tasks such as samplers. *Exclude* 1) *Management related* inspectors who enforce government or company regulations. 2) *Clerical* (recordkeeping) samplers and weighers and 3) *Agriculture* product graders and sorters - i.e. grading and sorting unprocessed food or other agricultural products.		
PRECISION INSPECTORS, TESTERS, AND GRADERS (ASSEMBLIES AND INSTALLATIONS INSPECTORS; ELECTROMECHANICAL INSPECTORS; POWER TRANSFORMER INSPECTORS AND TESTERS; ETC.): Include workers who perform precision inspecting, testing, and grading of parts, products, and equipment for defects, wear, and deviations from specifications. Most of these workers use precision measuring instruments and complex test equipment and hand tools. May make minor repairs. Workers who combine inspection and testing with major repair work should be reported in the Mechanics, Installers, and Repairers category.		830023
PRODUCTION INSPECTORS, TESTERS, GRADERS, SORTERS, SAMPLERS, AND WEIGHERS (QUALITY CONTROL TECHNICIANS; ARMATURE INSPECTORS; COIL INSPECTORS; ELECTRICAL CONTINUITY INSPECTORS; WELD INSPECTORS; ETC.): Inspect, test, grade, sort, sample, or weigh non-agricultural raw materials or processed, machined, fabricated or assembled parts or products. Work may be performed before, during, or after processing.		830053
MECHANICS, INSTALLERS, AND REPAIRERS (INCLUDE REPAIR TECHNICIANS; EXCLUDE MACHINE SETTERS ETC.): Include workers who repair, maintain and adjust motor vehicles, equipment, machines and tools including such work as machinery repair, auto repair and communications equipment repair. Workers may also install as well as repair equipment and machinery. Repair work may be performed on or off premises. Workers who only perform routine setting and adjusting of production machinery are *excluded* and should be reported in the later Machine Setter/Operative group. Also included are workers who do routine machinery maintenance such as oiling, changing parts (blades, rollers, etc.) and filling reservoirs.		

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
MACHINERY MAINTENANCE MECHANICS: Repair and maintain the operating condition of industrial production and processing machinery, printing machinery, and refinery and pipeline distribution systems. Duties include repairing in accordance with diagrams, operating manuals, or manufacturer's specifications, machinery and mechanical equipment, such as pumps, conveyor systems, and motors. *Exclude* Millwrights and Mobile Heavy Equipment Mechanics, such as crane, bulldozer, grader, or conveyor mechanics.		**851103**
MILLWRIGHTS (MACHINERY ERECTORS; ETC.): Install new machinery and heavy equipment according to layout plans, blueprints, and other drawings in an establishment and dismantle and move machinery and heavy equipment when changes in plant layout are required. Use a variety of hand tools, hoists, dollies, and trucks. May construct foundations for machines.		**851233**
MACHINERY MAINTENANCE WORKERS (MACHINE OILERS; POT LINERS; BELT CHANGERS; BLADE CHANGERS; ETC.): Perform routine maintenance of machinery, such as changing of parts and lubrication of machinery. Exclude workers who repair machinery.		**851283**
MAINTENANCE REPAIRERS, GENERAL UTILITY: Perform work involving two or more maintenance skills to keep the machines, mechanical equipment, and/or structure of an establishment in repair. This occupation is generally found in a small establishment where specialization in maintenance work is impractical. Duties may involve pipefitting, boilermaking, insulating, welding, machining, machine and equipment repairing, carpentry, and electrical work, as well as planning and laying out of work relating to repairs; repairing electrical and/or mechanical equipment; installing, aligning and balancing new equipment; and repairing buildings, floors, or stairs.		**851323**
DATA PROCESSING EQUIPMENT REPAIRERS: Repair, maintain, and install electronic computers (mainframes, minis, and micros), peripheral equipment, and word processing systems. *Exclude* Non-Data Processing Equipment Repairers and report them with Office Machine and Cash Register Servicers.		**857053**
ELECTRONIC HOME ENTERTAINMENT EQUIPMENT REPAIRERS (TELEVISION SERVICERS; RADIO REPAIRERS; STEREO EQUIPMENT REPAIRERS; VIDEO SYSTEM REPAIRERS; ELECTRONIC ORGAN MECHANICS; ETC.): Adjust and repair radio and television receivers, phonographs, stereo systems, tape recorders, video systems, and other electronic home entertainment equipment.		**857083**
ELECTRIC MOTOR, TRANSFORMER, AND RELATED REPAIRERS: Install, repair, and maintain electric motors, batteries, transformers, wiring, and switches using hand tools, power tools, gauges, and test instruments.		**857143**
ELECTRONICS REPAIRERS, COMMERCIAL AND INDUSTRIAL EQUIPMENT: Repair electronic equipment, such as industrial controls, telemetering, and missile control systems, radar systems, transmitters, and antennae using hand tools and testing instruments. *Exclude* repairers of data processing equipment and home entertainment equipment.		**857173**
HEATING, AIR CONDITIONING, AND REFRIGERATION MECHANICS AND INSTALLERS (OIL BURNER REPAIRERS; FURNACE INSTALLERS; AIR CONDITIONING MECHANICS; ETC.): Install and repair heating, air conditioning, and refrigerating systems. Duties include installation and repair of oil burners, hot-air furnaces, heating stoves, and similar equipment in homes and commercial establishments using hand and pipe threading tools. Also included are the installation and repair of cooling and central air conditioning systems.		**859023**
PRECISION INSTRUMENT REPAIRERS (OPTICAL INSTRUMENT REPAIRERS; ELECTRICAL INSTRUMENT REPAIRERS; ETC.): Install, test, repair, maintain, and adjust indicating, recording, telemetering, and controlling instruments used to measure and control variables, such as pressure, flow, temperature, motion, force, and chemical composition. Include instrument repairers who repair, calibrate, and test intruments, such as voltmeters, ammeters, and galvanometers.		**859053**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Cod
ALL OTHER MECHANICS, INSTALLERS, AND REPAIRERS (SMALL ENGINE SPECIALISTS; CAMERA AND PHOTOGRAPHIC EQUIPMENT REPAIRERS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**859993**
CONSTRUCTION TRADES AND EXTRACTIVE OCCUPATIONS, EXCEPT MATERIAL MOVING (EXCLUDE HELPERS AND LABORERS): Include in this group workers constructing, altering, and maintaining buildings, other structures, bridges, pipelines, and similar projects. The construction/maintenance work performed by these workers is found in many establishments, although the majority of these workers work for construction firms. Also include extractive workers, such as Blasters, Oil Well Drillers, and Mining Operatives. *Exclude* helpers and laborers.		
CARPENTERS: Perform the carpentry duties necessary to make or repair wooden structures, structural members, and fixtures and equipment using carpentry tools and woodworking machines. *Exclude* Cabinetmakers and Bench Carpenters.		**871023**
ELECTRICIANS: Install, maintain, and repair wiring, electrical equipment, and fixtures. Insure that work is in accordance with relevant codes. May read blueprints. Include Protective Signal Installers and Repairers and Street Light Servicers.		**872023**
PAINTERS AND PAPERHANGERS, CONSTRUCTION AND MAINTENANCE: *Painters*: Paint walls, equipment, buildings, bridges, and other structural surfaces using brushes, rollers, and spray guns. May mix colors or oils to obtain desired color or consistency. *Paperhangers*: Cover interior walls and ceilings of rooms with decorative wallpaper or fabric.		**874023**
PLUMBERS, PIPEFITTERS, AND STEAMFITTERS: Assemble, install, alter and repair pipe systems (metal, plastic, ceramic, composition, etc.) that carry water, steam, air, or other liquids or gases.		**875023**
ALL OTHER CONSTRUCTION AND EXTRACTIVE WORKERS, EXCEPT HELPERS: Include all other workers in this category not classified separately above.		**879993**
PRECISION PRODUCTION OCCUPATIONS (EXCLUDE PRECISION ASSEMBLERS AND REPORT THEM IN THE HANDWORKING SECTION): Include persons whose work requires a high degree of precision and usually an ability to interpret detailed specifications and instructions and to use independent judgement and knowledge gained through experience and training. Precision work may be accomplished either by hand or hand-held tools (or) by using various types of machinery. Normally substantial training, either classroom or on the job, is required to reach the "journey" level. In most cases, training of six months to several years or more is required. Precision assembling occupations are found in the Hand Working (including assemblers and fabricators) section found later in the form. Precision Inspectors and Testers should be reported in the earlier inspecting category. The occupations in this category are ordered according to material: metal, wood, textile, printing, food and a residual "all other" category.		
● *PRECISION METAL WORKERS*		
TOOL AND DIE MAKERS: Analyze variety of specifications, lay out metal stock, set up and operate machine tools, and fit and assemble parts to make and repair dies, cutting tools, jigs, fixtures, gauges, and machinist's hand tools. Include Paper Die Maker and Die Sinker. *Exclude* Die Setters.		**891023**
MACHINISTS: Set up and operate machine tools and fit and assemble parts to make or repair metal parts, mechanisms, tools or machines of an establishment applying knowledge of mechanics, shop mathematics, metal properties, and layout machining procedures. Study specifications, such as blueprints, sketch, or description of part to be replaced, and plan sequence of operations.		**891083**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
TOOL GRINDERS, FILERS, SHARPENERS, AND OTHER PRECISION GRINDERS (SAW FILERS; ETC.): Perform such operations as precision smoothing, sharpening, polishing, and grinding of metal objects by the wearing action of abrasive materials or machine files. Include such occupations as Tool, Cylinder, or Card Grinders, or Grinder Operators, Saw Filers, and Filer-Finishers.		**891113**
PRECISION LAYOUT WORKERS, METAL: Lay out reference points or dimensions on structural steel shapes or plates and metal stock or workpieces, such as castings, plates, tubes or machine parts, to indicate processing to be done, such as machining, fabricating, welding, and assembling.		**891173**
SHEET METAL WORKERS: Fabricate, assemble, install, and repair sheet metal products and equipment, such as control boxes, drainpipes, and furnace casings. Work may involve any of the following: Set up and operate fabricating machines to cut, bend, and straighten sheet metal; shape metal over anvils, blocks, or forms using hammer; operate soldering and welding equipment to join sheet metal parts; inspect, assemble, and smooth seams and joints of burred surfaces.		**891323**
ALL OTHER PRECISION METAL WORKERS (PRECISION INSTRUMENT MAKERS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**891993**
● *OTHER PRECISION WORKERS*		
ALL OTHER PRECISION WORKERS (PRECISION DETAIL DESIGN DECORATORS AND PAINTERS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**899993**
MACHINE SETTERS, SET-UP OPERATORS, OPERATORS, AND TENDERS: Include in this group workers who set up, operate, or tend equipment or machinery (usually large production machinery). In the following occupational categories workers who set up or set up & operate machines are grouped separately from workers who operate or tend machines..........The occupations in this section are organized according to the material being processed and ordered as follows: metal & plastic (working, fabricating, and processing), wood, printing and related, textile, and a residual (other) category. Occupations that do not *primarily* involve metal and plastic working machines, wood working machines, printing and related machines, or textile machines should be reported in the residual (other) category..........NOTE: *Excluded* from this category are 1) Transportation and Material Moving occupations; 2) Handworking occupations - workers using hand or hand-held power tools; and 3) Plant and System Operators. The appropriate groups for these workers follow this section.		
● *SELECTED MACHINE TOOL CUTTING SETTERS, OPERATORS, AND RELATED WORKERS- METAL AND PLASTIC*		
SAWING MACHINE TOOL SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (PROFILE SAW SET-UP OPERATORS; JIGSAWYERS; CUT-OFF SAW SET-UP OPERATORS; ETC.): Set up or set up and operate metal or plastic sawing machines, such as band saws, circular saws, friction saws, hacksawing machines, and jigsaws, to cut straight, curved, irregular, or internal patterns in metal or plastic stock or to trim edges of metal or plastic objects.		**911023**
LATHE AND TURNING MACHINE TOOL SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (TURRET LATHE SET-UP OPERATORS; SCREW MACHINE SET-UP OPERATORS; ENGINE LATHE SET-UP OPERATORS; ETC.): Set up or set up and operate plastic or metal lathe and turning machines to turn, bore, thread, form, or face plastic or metal materials, such as wire, rod, or bar stock according to specifications.		**911053**

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EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
DRILLING AND BORING MACHINE TOOL SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (SINGLE SPINDLE DRILL PRESS SET-UP OPERATORS; HORIZONTAL BORING-MILL SET-UP OPERATORS; ETC.): Set up or set up and operate drilling machines to perform drilling and other machining operations, such as boring, reaming, tapping of holes, milling, and countersinking, in metal or plastic workpieces according to specifications.		911083
MILLING AND PLANING MACHINE SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (TOOL SHAPER SET-UP OPERATORS; PROFILING MACHINE SET-UP OPERATORS; ETC.): Set up or set up and operate milling or planing machines to mill, plane, shape, groove, or profile metal or plastic workpieces according to specifications.		911113
GRINDING, LAPPING, AND BUFFING MACHINE TOOL SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (GRINDER SET-UP OPERATORS; ETC.): Set up or set up and operate grinding and related tools that remove excess material or burrs from internal and external surfaces, sharpen edges or corners, or buff, hone and polish metal or plastic workpieces according to specifications.		911143
MACHINE TOOL CUTTING OPERATORS AND TENDERS, METAL AND PLASTIC: Operate or tend one type of cutting machine tool which has previously been set up. Workers who operate or tend more than one type of cutting machine should be reported with Combination Machine Tool Operators and Tenders, Metal and Plastic. Types of cutting machine tools include: SAWING MACHINES LATHE AND TURNING MACHINES DRILLING AND BORING MACHINES MILLING AND PLANING MACHINES GRINDING MACHINES BUFFING AND POLISHING MACHINES LAPPING AND HONING MACHINES		911173
● *SELECTED MACHINE FORMING SETTERS, OPERATORS, AND RELATED WORKERS- METAL AND PLASTIC*		
PUNCHING MACHINE SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (PUNCH PRESS SETTERS; DUPLICATOR PUNCH SET-UP OPERATORS; ETC.): Set up or set up and operate machines to punch, crimp, cut blanks, or notch metal or plastic workpieces between preset dies according to specifications.		913023
PRESS AND PRESS BRAKE MACHINE SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (BENDING MACHINE SET-UP OPERATORS; ETC.): Set up or set up and operate power press machines or power brake machines to bend, form, stretch, notch, punch, or to straighten metal or plastic plate and structural shapes as specified by work order, blueprints, drawing, templates, or layout.		913053
SHEAR AND SLITTER MACHINE SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (SLITTER SERVICE AND SETTERS; ANGLE SHEAR SET-UP OPERATORS; ETC.): Set up or set up and operate power shear or slitting machines to cut metal or plastic material, such as plates, sheets, slabs, billets or bars, to specified dimensions and angles.		913083
FORGING MACHINE SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (DROP-HAMMER OPERATORS; UPSETTERS; DIE SETTERS; ETC.): Set up or set up and operate forging machines, such as a forging press, coining press, drophammer, forging roll, or upsetter, to taper, shape, or form metal or plastic parts following work order or blueprint specifications.		913173
MACHINE FORMING OPERATORS AND TENDERS, METAL AND PLASTIC (METAL PUNCH PRESS OPERATORS; ETC.): Operate or tend one type of forming machine which has previously been set up. Workers who operate more than one type of forming machine should be reported with Combination Machine Tool Operators and Tenders, Metal and Plastic. Types of forming machines include: PUNCHING MACHINES SHEAR AND SLITTER MACHINES EXTRUDING AND DRAWING MACHINES ROLLING MACHINES PRESS AND PRESS BRAKE MACHINES FORGING MACHINES		913213

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
● *NUMERICAL AND COMBINATION MACHINE TOOL SETTERS, OPERATORS, AND RELATED WORKERS-METAL AND PLASTIC*		
NUMERICAL CONTROL MACHINE TOOL OPERATORS AND TENDERS, METAL AND PLASTIC (NUMERICAL CONTROL DRILL PRESS OPERATORS; NUMERICAL CONTROL MILLING MACHINE OPERATORS; ETC.): Set up and operate magnetic or punched-tape controlled machine tools that automatically mill, drill, broach, and ream metal parts. May adjust machine feed and speed and change cutters to machine parts to specification when automatic programming is faulty or if machine malfunctions.		**915023**
COMBINATION MACHINE TOOL SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC: Set up or set up and operate more than one type of cutting or forming machine tool, such as as gear hobbers, lathes, press brakes, shearing, and boring machines. *Exclude* workers who set up or set up and operate only one type of metal or plastic working machine.		**915053**
COMBINATION MACHINE TOOL OPERATORS AND TENDERS, METAL AND PLASTIC (TRANSFER MACHINE OPERATORS; ETC.): Operate or tend more than one type of cutting or forming machine tool which has been previously set up, such as band saws, press brakes, slitting machines, drills, lathes, and boring machines. *Exclude* workers who operate or tend only one type of cutting or forming machine.		**915083**
● *SELECTED METAL FABRICATING AND RELATED MACHINE SETTERS, OPERATORS, AND RELATED WORKERS*		
WELDING MACHINE SETTERS AND SET-UP OPERATORS (RESISTANCE MACHINE WELDER SETTERS; ELECTRON BEAM WELDER SETTERS; ETC.): Set up or set up and operate welding machines that join or bond together parts of fabricated metal products and metal components, such as panels, frames, yokes, tubes, and containers according to specifications and blueprints.		**917023**
WELDING MACHINE OPERATORS AND TENDERS (LASER-BEAM MACHINE OPERATORS; ULTRASONIC WELDING MACHINE OPERATORS; ETC.): Operate or tend welding machines that join or bond together parts of fabricated metal products and metal components, such as panels, frames, yokes, tubes, and containers according to specifications and blueprints.		**917053**
SOLDERING AND BRAZING MACHINE SETTERS AND SET-UP OPERATORS (BRAZING MACHINE SETTERS; ETC.): Set up or set up and operate soldering or brazing machines to bronze, solder, heat treat, or spot weld fabricated metal products or components as specified by work orders, blueprints, and layout specifications.		**917083**
SOLDERING AND BRAZING MACHINE OPERATORS AND TENDERS (TYPE SOLDERING MACHINE TENDERS; ETC.): Operate or tend soldering and brazing machines that braze, solder, or spot weld fabricated metal products or components as specified by work orders, blueprints, and layout specifications.		**917113**
● *SELECTED METAL AND PLASTIC PROCESSING MACHINE SETTERS, OPERATORS, AND RELATED WORKERS*		
PLASTIC MOLDING AND CASTING MACHINE SETTERS AND SET-UP OPERATORS (MOLD SETTERS; COMPRESSION MOLDING MACHINE SET-UP OPERATORS; ETC.): Set up or set up and operate plastic molding machines, such as compression or injection molding machines, to mold or cast products to specified shape from thermoplastic materials.		**919023**
PLASTIC MOLDING AND CASTING MACHINE OPERATORS AND TENDERS (VACUUM PLASTIC FORMING MACHINE OPERATORS; INJECTION MOLDING MACHINE TENDERS; ETC.): Operate or tend plastic molding machines, such as compression or injection molding machines, to mold, form, or cast plastic products to specified shape from thermoplastic materials.		**919053**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
METAL MOLDING, COREMAKING, AND CASTING MACHINE SETTERS AND SET-UP OPERATORS (DIE CASTING MACHINE SETTERS; ROTOR CASTING MACHINE SET-UP OPERATORS; ETC.): Set up or set up and operate metal casting machines, such as diecasting and continuous casting machines, and molding and coremaking machines, such as roll-over, squeeze, and shell molding machines, to mold or cast metal products, such as tubes and rods, and metal parts, such as automobile trim, carburetor housings, and motor parts.		919083
METAL MOLDING, COREMAKING, AND CASTING MACHINE OPERATORS AND TENDERS (CENTRIFUGAL CASTING MACHINE OPERATORS; PIPE COREMAKERS; ETC.): Operate or tend metal molding, casting, or coremaking machines, such as centrifugal casting machines, vacuum casting machines, turnover draw-type coremaking machines, conveyor-screw coremaking machines, and diecasting machines, to mold or cast metal products, such as pipes, brakedrums, and rods, and metal parts, such as automobile trim, carburetor housings, and motor parts.		919113
ELECTROLYTIC PLATING AND COATING MACHINE SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (ELECTROGALVANIZING MACHINE OPERATORS; PLASTICS PLATERS; ELECTROPLATERS; ETC.): Set up or set up and operate electrolytic plating or coating machines, such as continuous multistrand electrogalvanizing machines, to coat metal or plastic products electrolytically with chromium, copper, cadmium, or other metal to provide protective or decorative surfaces or to build up worn surfaces according to specifications.		919173
ELECTROLYTIC PLATING AND COATING MACHINE OPERATORS AND TENDERS, METAL AND PLASTIC (PRODUCTION PLATERS; MATRIX PLATERS; ETC.): Operate or tend electrolytic plating or coating machines, such as zinc-plating machines and anodizing machines, to coat metal or plastic products electrolytically with chromium, zinc, copper, cadmium, or other metal to provide protective or decorative surfaces or to build up worn surfaces according to specifications.		919213
HEATING EQUIPMENT SETTERS AND SET-UP OPERATORS, METAL AND PLASTIC (INDUCTION MACHINE SETTERS; FLAME-HARDENING MACHINE SETTERS; ETC.): Set up or set up and operate heating equipment, such as heat treating furnaces, flame-hardening machines, and induction machines, that anneal or heat-treat metal objects according to specifications.		919283
HEAT TREATING, ANNEALING, AND TEMPERING MACHINE OPERATORS AND TENDERS, METAL AND PLASTIC (TEMPERERS; CASE HARDENERS; FLAME-HARDENING MACHINE OPERATORS; ETC.): Operate or tend machines, such as furnaces, baths, flame-hardening machines, and electronic induction machines, to harden, anneal, and heat-treat metal products or metal parts.		919323
FURNACE OPERATORS AND TENDERS (OPEN HEARTH FURNACE OPERATORS; CUPOLA TENDERS; OXYGEN FURNACE OPERATORS; ETC.): Operate or tend furnaces, such as gas, oil, coal, electric-arc or electric induction, open-hearth, or oxygen furnaces, to melt and refine metal prior to casting or to produce specified types of steel. *Exclude* heat treating and related furnace operators.		919353
● *ALL OTHER METAL AND PLASTIC MACHINE SETTERS, OPERATORS, AND RELATED WORKERS*		
ALL OTHER METAL AND PLASTIC (CUT, FORM, FABRICATE OR PROCESS) MACHINE SETTERS AND SET-UP OPERATORS: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		921973
ALL OTHER METAL AND PLASTIC (CUT, FORM, FABRICATE OR PROCESS) MACHINE OPERATORS AND TENDERS (COMPRESSION OR INJECTION MOLDING MACHINE OPERATORS; ETC.): Include all other workers in this category not classified separately above.		921983

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
● *SELECTED PRINTING, BINDING, AND RELATED WORKERS*		
PRINTING PRESS MACHINE SETTERS AND SET-UP OPERATORS: Set up or set up and operate various types of printing machines, such as offset lithographic presses, letter or letterset presses, flexographic presses, or gravure presses to produce printed material such as books, manuals, or pamphlets.		925103
SCREEN PRINTING MACHINE SETTERS AND SET-UP OPERATORS: Set up or set up and operate screen printing machines to print designs onto articles and materials, such as glass or plastic containers or ware, cloth, and paper.		925243
ALL OTHER PRINTING RELATED SETTERS AND SET-UP OPERATORS: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		925293
PRINTING PRESS MACHINE OPERATORS AND TENDERS: Operate or tend various types of printing machines, such as offset lithographic presses, letter or letterset presses, flexographic or gravure presses to produce print on paper or other materials such as plastic, cloth, or rubber.		925433
● *OTHER MACHINE SETTERS, OPERATORS, AND RELATED WORKERS*		
ELECTRONIC SEMICONDUCTOR PROCESSORS (CRYSTAL FINISHERS; CRYSTAL LAPPERS; CHEMICAL ETCH OPERATORS; CRYSTAL GROWERS; DIFFUSION FURNACE OPERATORS; ETC.): Include workers who process materials used in manufacture of electronic semiconductors: load semiconductor material into furnace; saw formed ingots into segments; load individual segment into crystal growing chamber and monitor controls; locate crystal axis in ingot using x-ray equipment and saw ingots into wafers; clean, polish, and load wafers into series of special purpose furnaces, chemical baths, and equipment used to form circuitry and change conductive properties. May scribe or separate wafer into dice.		929023
COATING, PAINTING, AND SPRAYING MACHINE SETTERS AND SET-UP OPERATORS: Set up or set up and operate machines to coat or paint any of a wide variety of products, such as food products, glassware, cloth, ceramic, metal, plastic, paper, and wood products, with lacquer, silver and copper solution, rubber, paint, varnish, glaze, enamel, oil, or rustproofing materials. *Exclude* setters and set-up operators who coat or plate metal or plastic with metal using electrolytic or nonelectrolytic processes.		929513
COATING, PAINTING, AND SPRAYING MACHINE OPERATORS AND TENDERS: *Coating Machine Operators or Tenders*: Operate or tend machines to coat any of a wide variety of items, such as coating food products with sugar, chocolate and butter, coating paper and paper products with chemical solutions, wax, and glazes, or coating fabric with rubber or plastic. *Painting and Spraying Machine Operators and Tenders*: Operate or tend machines to spray or paint decorative, protective, or other finish or coating, such as adhesive, lacquer, paint, stain, latex, preservative, or oil, to any of a wide variety of items or materials, such as wood and wood products, ceramics, and glass. This occupation includes workers who apply coating or finish to products with solutions or materials preparatory to consumer use or further processing.		929533
CLEANING, WASHING, AND PICKLING EQUIPMENT OPERATORS AND TENDERS: Operate or tend machines to wash or clean items, such as barrels or kegs, glass products, tin plate surfaces, dried fruit, pulp, animal stock, coal, manufactured articles, plastic, or rubber, to remove impurities preparatory to further processing.		929583
CRUSHING, GRINDING, MIXING, AND BLENDING MACHINE OPERATORS AND TENDERS (DEBURRING MACHINE OPERATORS; MIXING TUMBLER OPERATORS; COATING MIXER TENDERS; ETC.): *Crushing, Grinding, and Polishing Machine Operators and Tenders*: Operate or tend machines to crush or grind any of a wide variety of materials, such as coal, glass, plastic, dried fruit, grain, stone, chemicals, food, or rubber, or operate or tend machines that buff and polish materials or products, such as stone, glass, slate, plastic or metal trim, bowling balls, or eyeglasses. *Mixing and Blending Machine Operators and Tenders*: Operate or tend machines to mix or blend any of a wide variety of materials such as spices, dough batter, tobacco, fruit juices, chemicals, livestock feed, food products, color pigments, or explosive ingredients.		929653

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
PACKAGING AND FILLING MACHINE OPERATORS AND TENDERS (PRODUCTION PACKAGERS; ETC.): Operate or tend machines, such as filling machines, casing running machines, ham rolling machines, preservative filling machines, baling machines, wrapping machines, and stuffing machines, to prepare industrial or consumer products, such as gas cylinders, meat and other food products, tobacco, insulation, ammunition, stuffed toys and athletic equipment, and upholstered pads, as end products or for storage and shipment.		**929743**
ALL OTHER MACHINE SETTERS AND SET-UP OPERATORS: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**929973**
ALL OTHER MACHINE OPERATORS AND TENDERS (SEWING MACHINE OPERATORS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**929983**
HAND WORKING OCCUPATIONS, INCLUDING ASSEMBLERS AND FABRICATORS: Include workers who perform hand assembling, fabricating, finishing or other handwork. This category includes a wide variety of handwork in addition to assembling, such as welding, cutting, molding, painting, grinding and sewing. Although precision assembling is included in this category, workers performing other types of *precision* handwork such as patternmaking, precision molding, layout, tailoring, design painting and butchering are *excluded* and should be reported in the earlier "Precision" category.		
● *PRECISION ASSEMBLERS*		
MACHINE BUILDERS AND OTHER PRECISION MACHINE ASSEMBLERS (MACHINE BUILDERS; ETC.): Construct, assemble, or rebuild machines or equipment, such as engines, turbines, construction, oil field, rolling mill, textile, woodworking, paper, printing, food wrapping machinery, or office machines. Fit or assemble components or subassemblies. Install moving parts and assemble system of gears by aligning and meshing gears in gearbox. May test or assist in testing operation of completed product.		**931053**
ELECTROMECHANICAL EQUIPMENT ASSEMBLERS- PRECISION (SERVOMECHANISM ASSEMBLERS; WAVE GUIDE ASSEMBLERS; ADP ELECTROMECHANICAL EQUIPMENT ASSEMBLERS; ETC.): Assemble, test, and prepare electromechanical equipment or devices, such as servomechanisms, gear trains, gyros, dynamometers, ejection seat mechanisms, wave guides, magnetic drums, tape drives, punched-card reading devices, brakes, control linkage, actuators, and gearbox mechanisms according to specifications.		**931113**
ELECTRICAL AND ELECTRONIC EQUIPMENT ASSEMBLERS- PRECISION (TRANSFORMER ASSEMBLERS; ETC.): Assemble or modify prototypes or final assemblies of electrical or electronic equipment, such as missile control systems, radio and test equipment, computers, machine-tool numerical controls, radar, sonar, and telemetering systems, or appliances. Include workers who primarily assemble electrical systems for machinery.		**931143**
ALL OTHER PRECISION ASSEMBLERS: Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		**931973**

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EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
● *OTHER HAND WORKERS, INCLUDING ASSEMBLERS AND FABRICATORS*		
MACHINE ASSEMBLERS (VENDING MACHINE ASSEMBLERS; MACHINE SUBASSEMBLERS; AIR-CONDITIONING COIL ASSEMBLERS; ETC.): Include Machine Assemblers who perform work at a level less than that required of the precision level. Include such occupations as Air Conditioning Coil Assemblers, Ball Bearing Ring Assemblers, Fuel Injection Assemblers, and Subassemblers.		939023
ELECTRICAL AND ELECTRONIC ASSEMBLERS (ELECTRONIC WIRERS; ELECTRIC MOTOR WINDERS OR ASSEMBLERS; ELECTRONIC SCALE SUBASSEMBLERS; CAPACITOR ASSEMBLERS; BATTERY ASSEMBLERS; ETC.): Include Electrical and Electronic Assemblers who perform work at a level less than that required of the precision level. Include such occupations as Electronic Wirers, Armature Connectors, Electric Motor Winders, Skein Winders, Carbon Brush Assemblers, Battery and Battery Parts Assemblers, Electric Sign Assemblers, and Electrical and Electronic Subassemblers.		939053
COIL WINDERS, TAPERS, AND FINISHERS: Wind wire coils by the use of coil winding machines, used in the manufacturing of electrical components, such as resistors and transformers, and electrical equipment, such as field cores, bobbins, and armature cores, and by the use of coil making machines to form coils for electrical motors, generators, and control equipment.		939083
WELDERS AND CUTTERS (LEADBURNERS; ARC-CUTTERS; WELDER-FITTERS; TACK WELDERS; ETC.): Use hand welding and flamecutting equipment, such as arc welders, gas welders, and gas torches, to weld together metal components of such products as pipelines, automobiles, boilers, and ships, or join together components of fabricated sheet metal assemblies, or cut, trim, or scarf metal objects to dimensions as specified by layout, work orders, or blueprints.		939143
SOLDERERS AND BRAZERS (RESISTANCE BRAZERS; SOLDERER-DIPPERS; ULTRASONIC SOLDERERS; ETC.): Join together metal parts, components of metal products, or fill holes, indentations, and seams of fabricated metal products using hand soldering and brazing equipment according to specification of job order, work layout, or blueprints.		939173
GRINDING AND POLISHING WORKERS, HAND (METAL MOLD DRESSERS; GRINDER-CHIPPERS; FILERS; SANDERS AND BUFFERS; STONE POLISHERS; WOOD SANDERS; ETC.): Grind and polish using hand tools or hand held power tools a wide variety of metal, stone, clay, plastic, and glass objects or parts. Include such occupations as Grinders and Chippers, Polishers and Buffers, Metal Sanders and Finishers, Glass Grinders and Polishers, and Plastic Buffers and Finishers. *Exclude* precision level workers.		939533
ASSEMBLERS AND FABRICATORS- EXCEPT MACHINE, ELECTRICAL, ELECTRONIC, AND PRECISION: Assemble and/or fit together parts to form complete units or subassemblies at a bench, conveyor line, or on the floor. Work may involve the use of hand tools, power tools and special equipment in order to carry out fitting and assembly operations. Included in this occupation are assemblers whose duties are of a non-precision nature. *Exclude* electrical, electronic, machine and precision assemblers, and workers who perform specialized operations exclusively as a part of assembly operations, such as riveting, welding, soldering, machining, or sawing.		939563
ALL OTHER HAND WORKERS (PORTABLE MACHINE CUTTERS; HAND MOLDERS AND CASTERS; ETC.): Include all other workers in this category not classified separately above. *Please identify in Section V (at the end of this form) all occupations included in this category that are numerically important and require substantial training, or are emerging due to technological changes in your industry.*		939993
PLANT AND SYSTEM OPERATORS **PLANT AND SYSTEM OCCUPATIONS (STATIONARY ENGINEERS; ETC.):** Include workers who control or operate systems of machines or entire processes through use of control panels or centralized controls. Plant and System Operators control such systems as chemical, petroleum, or water treatment systems.		950003

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
TRANSPORTATION AND MATERIAL MOVING MACHINE AND VEHICLE OPERATORS: Include in this group workers who operate or control vehicles used to transport people or materials. Also included are transportation related workers such as Bridge Tenders, Service Station Attendants, and Parking Lot Attendants. Material moving also includes operation of equipment such as conveyors, pumps, cranes, and hoists.		
● *TRANSPORTATION EQUIPMENT OPERATORS*		
TRUCK DRIVERS, HEAVY OR TRACTOR TRAILER: Drive tractor-trailer combination or truck with a capacity of more than 3 tons to transport and deliver goods, livestock, or materials in liquid, loose or packaged form. May be required to unload truck.		**971023**
TRUCK DRIVERS, LIGHT- INCLUDE DELIVERY AND ROUTE WORKERS: Drive truck with a capacity under 3 tons. May drive light truck to deliver or pick-up merchandise and load and unload truck.		**971053**
ALL OTHER TRANSPORTATION AND RELATED WORKERS: Include all other workers in this category not classified separately above.		**978993**
● *MATERIAL MOVING EQUIPMENT OPERATORS*		
INDUSTRIAL TRUCK AND TRACTOR OPERATORS (FORKLIFT TRUCK OPERATORS; ELECTRIC TRUCK OPERATORS; ETC.): Operate gasoline or electric powered industrial trucks or tractors equipped with fork lift, elevated platform, or trailer hitch to move materials in an establishment, warehouse, storage yard, factory, or at a construction site. *Exclude* Logging Tractor Operators.		**979473**
CONVEYOR OPERATORS AND TENDERS (EXCLUDE LOADERS AND FEEDERS): Control or tend conveyors or conveyor systems that move materials or products to and from stockpiles, processing stations, departments, vehicles, and underground workings. May control speed and routing of materials or products.		**979513**
ALL OTHER MATERIAL MOVING EQUIPMENT OPERATORS: Include all other workers in this category not classified separately above.		**979993**
HELPERS, LABORERS, AND MATERIAL MOVERS, HAND- EXCLUDE AGRICULTURE AND FORESTRY LABORERS: Include workers performing *non-machine* tasks generally of a routine nature. These workers help the production, construction, operating, and maintenance workers covered in the earlier sections. Although they do not operate or tend the machinery or equipment directly, these workers assist in the work of the establishment by machine feeding and offbearing, moving materials (manually), or loading and unloading. They may also clean and wash vehicles and equipment. Handworkers (see earlier section) are distinguished from the workers in this group because they are involved directly in the making of a product.		
MECHANIC AND REPAIRER HELPERS: Help mechanics and repairers in maintenance, parts replacement, and repair of vehicles, industrial machinery, and electrical and electronic equipment. Perform duties such as furnishing tools, materials and supplies to other workers; cleaning work area, machines, and tools; and holding materials or tools for other workers.		**981023**
MACHINE FEEDERS AND OFFBEARERS: Feed materials into machine or remove materials from machines or equipment that is automatic or tended by other workers.		**985023**
FREIGHT, STOCK, AND MATERIAL MOVERS, HAND (MATERIAL HANDLERS; ETC.): Include workers who move materials manually. Freight, stock and material movers (hand) work in a variety of settings such as warehouses, production areas, stockrooms, or shipping departments.		**987003**

EMPLOYMENT BY OCCUPATION

Occupations	Number of Employees	Office Code
HAND PACKERS AND PACKAGERS: Pack or package by hand a wide variety of products and materials. *Exclude* workers whose jobs require more than minimum training.		989023
ALL OTHER HELPERS, LABORERS, AND MATERIAL MOVERS, HAND (MACHINE OPERATIVE HELPERS; VEHICLE WASHERS AND EQUIPMENT CLEANERS; ETC.): Include all other workers in this category not classified separately above.		989993

OVERALL TOTAL OF EMPLOYMENT
(Sum of non-shaded boxes)
(This overall total employment should agree with item D on page 1.)

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Please use the space below to identify workers reported in any "All Other" category who are in occupations that are numerically important, require substantial training, or are emerging due to technological changes in your industry.

Office Code of "All Other" Category in which Workers are Reported	Job Title and Short Description of Job Duties	Number of Employees	For Office Use Only

OFFICE USE ONLY	FIPS State Code	Schedule Number	Survey Code	SIC	Unit Total Employment	Auxiliary Unit Code	Reviewed By	Date

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federally employed scientific and technical personnel

purpose and background

The National Science Foundation (NSF) maintains a data base on Federal civilian scientists and engineers, support personnel (technicians), and individuals whose highest degree is in a science and engineering (S/E) field but who work in non-S/E jobs. The data, based on tabulations from the Central Personnel Data File of the Office of Personnel Management (OPM), provide insight into the Federal sector's requirements for and utilization of these workers. The data are useful for evaluating the impacts of proposed changes in Federal personnel policies and practices.

data content

As Federal workers enter on duty, separate, or otherwise change status their agencies must notify OPM on Standard Form 50. The variables now available (October 1985) on the file cover occupational classification, functional classification, employing agency, field and level of highest degree, year of birth, salary, grade and step, work activity, work location by State, sex, age, minority group status, management/supervisory status, and entry-on-duty date.

sample design

Since 1981, NSF tabulations have been based on the Central Personnel Data File (CPDF) of OPM. Previous tabulations were based on the White Collar Survey of Federal civilian personnel maintained by OPM. Employing agency and occupational classifications are fully reported; most other variables on the file have an 80-percent or higher response rate.

Data are not available for the Central Intelligence Agency, the National Security Agency, the District of Columbia Government, the Postal Service (since 1981), and for some small offices within the Legislative Branch of Government such as the Congressional Budget Office and the Government Printing Office.

data availability

Complete Federal data are available for 1981 and 1983-85. The white collar data were first published by NSF in 1954 and covered detailed occupation and agency. Salary data became available in 1964; work activity in 1969; educational and State data in 1973; sex, age, grade and step, and minority group data in 1976; management/ supervisory status, and entry-on-duty date in 1981.

data access

Summary statistical tables are available on diskettes prepared for use on an IBM-compatible microprocessor. In addition, data tapes for 1981 and 1983-85 are available subject to restrictions of the Privacy Act of 1976 which requires OPM agreement for data release. Further information may be obtained from:

Mr. John Tsapogas
Division of Science Resources
Studies
Government Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L602
Washington, D.C. 20550
(202) 634-4636

foreign scientists and engineers

purpose and background

Scientists and engineers entering the United States as immigrants have averaged about 10,000 yearly since 1976. The National Science Foundation (NSF) maintains a data base on the annual inflows of these personnel, and periodically publishes the data and analysis of trends. The impact of immigration laws are also examined.

data content

Data are compiled by the U.S. Immigration and Naturalization Service of the U. S. Department of Justice as part of its overall statistics program. Data available since 1965 cover major occupational group, country of birth and of last residence (one year or more), age, sex, State of intended residence, and change-of-status from nonimmigrant to immigrant while already living in the United States.

sample design

The data represent the total annual flow of foreign scientists and engineers admitted to the United States for purposes of permanent legal residence. These personnel have the right to apply for U. S. citizenship at some future time.

data availability

Trend data for 1966-78 and 1982-86 for occupational group, worker certification, change-of-status, and other characteristics are available. Data for 1979-81 are unavailable.

data access

Summary statistical tables are available on diskettes prepared for use on IBM-compatible microprocessor. Inquiries should be addressed to:

Ms. Nancy Conlon
Division of Science Resources
Studies
Scientific and Technical Personnel
Characteristics Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L611
Washington, D.C. 20550
(202) 634-4664

science and technology funding resources

federal funds for research and development

purpose and background

The Federal Funds for Research and Development Survey, conducted annually since fiscal year (FY) 1952, provides comprehensive statistical information on the size and scope of Federal agency funding for research and development.

survey instrument

Each agency provides data for three years: actual funding for the prior fiscal year, as well as estimates for the current and next fiscal year. These estimates are based on funding levels contained in the Federal budget document. Most data are collected in terms of obligations, although selected portions of the survey inquire about funding in outlay terms. The research and development (R&D) data are classified by character of work, type of performer, science and engineering (S/E) field, geographic (State) distribution, and R&D plant.

A copy of the FY 1985 survey, covering the years 1985, 1986, and 1987 is reproduced on the following pages. The data, for the most part, were collected using a diskette-based microcomputer data entry system called PCSURVEY.

sample design

Data are collected from all Federal agencies funding research and development, with a response rate of 100 percent.

data availability

The Federal Funds Survey is conducted annually and has continued without interruption since FY 1952. Time-series data are available for research and development by agency, character of work, and performer for the period beginning with FY 1955. Data on Federal obligations for research by agency and detailed S/E field are available from FY 1967; Federal obligations for research to universities and colleges by agency and detailed S/E field begin in FY 1973.

data access

Summary statistical tables of data from this survey are available on diskettes prepared for use on an IBM-compatible microprocessor. Federal Funds survey data are also available in hard copy. Inquiries should be addressed to:

Ms. Vanessa Richardson
Division of Science Resources Studies
Government Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L602
Washington, D.C. 20550
(202) 634-4636

The data are also available on magnetic tape from:

Ms. Roweena Bowen
Moshman Associates, Inc
6400 Goldsboro Road
Bethesda, Maryland 20817
(301) 229-3000

Prior-year data as reported in earlier Federal Funds reports do not reflect subsequent reclassification changes and should not be used.

INSTRUCTIONS FOR REPORTING DATA

ANNUAL SURVEY OF FEDERAL FUNDS FOR RESEARCH AND DEVELOPMENT

VOLUME XXXV

Fiscal Years 1985, 1986, *and* 1987

Conducted by the

NATIONAL SCIENCE FOUNDATION

NSF Form 818

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ANNUAL SURVEY OF FEDERAL FUNDS FOR RESEARCH AND DEVELOPMENT

Fiscal Years 1985, 1986, AND 1987

INTRODUCTION

This annual survey is conducted to measure Federal support of, and participation in, national scientific activities in terms of obligations and outlays. The results of this survey will be available in the Federal Funds for Research and Development series, Volume XXXV.

In this survey, data are to be provided for fiscal years 1985, 1986, and 1987 covering funding support in the areas of research, development, and R&D plant. No new questions have been added. The scope of the survey remains identical with the scope of last year's survey, as follows:

* Obligations and outlays, in summary form, for research and development and R&D plant.

* Obligations for total research, basic research, and applied research, by field of science.

* Obligations for total research, basic research, and applied research performed at universities and colleges, by field of science.

* Obligations for total research, basic research, applied research, and development, by performer.

* Obligations for total research and development and basic research, by foreign country.

* Obligations for R&D plant by performer of the research and development supported.

* Obligations for research and development and R&D plant, by State and performer or performer supported.

Reports from Federal agencies should originate from all organizational subdivisions supporting research, development, or R&D plant.

Please read the instructions carefully before completing the survey.

SUBMISSION DUE DATE

Due date for submission of responses for the survey is April 30, 1986.

INSTRUCTIONS FOR COMPLETING THE SURVEY

Responses to the survey will be submitted using the enclosed microcomputer data entry system -- PCSURVEY. PCSURVEY is a diskette based system that has been designed for use in the "A" drive of any IBM PC or IBM compatible microcomputer system. It is a user-friendly, menu-driven system with extensive built-in instructions and HELP facilities. Detailed instructions in the use of PCSURVEY have been included in the survey package. Members of the NSF staff are ready to assist in clarifying the instructions and to discuss any problems that may arise in their application.

Although a computer-generated copy of the submission forms has been included in this package, it is not necessary to return a paper copy of the survey to NSF. These forms are to be used as preliminary work tables and to assist in intra-agency data collection. Additional copies of the instructions and tables are available upon request.

Agencies that do not have access to an IBM PC or IBM compatible microcomputer and are unable to complete the survey using PCSURVEY should contact the National Science Foundation.

All inquiries should be made to:

Ms. Vanessa Richardson
Government Studies Group
(202) 634-4636

Comments and recommendations for formulating and refining future questionnaires are solicited.

When returning the original diskette to NSF (in the enclosed mailer), please enclose with the diskette the name and phone number of the individual with whom survey matters may be discussed.

GENERAL CONCEPTS AND DEFINITIONS

The following general concepts and definitions are applicable throughout the survey.

I. An agency is an organization of the Federal Government whose principal executive officer reports to the President. The Library of Congress, however, whose chief officer reports to the Congress, is also included in the survey. Subdivision refers to any organizational unit of a reporting agency, such as a bureau, division, office or service.

II. Obligations and outlays reported should be consistent with figures shown for fiscal years 1985, 1986, and 1987 appearing in The Budget of the United States Government, Fiscal Year 1987.

Obligations and outlays cover all transactions that occurred in fiscal year 1985, and those estimated for 1986 and 1987. The data should include all Federal funds available to an agency that the agency received or expects to receive, from direct appropriations, trust funds, and special account receipts, corporate income, or other sources, including funds appropriated to the President.

The amounts shown for each year should reflect obligations or outlays for that year regardless of when the funds were originally authorized or received, and regardless of whether or not they were appropriated, received, or identified in the agency's budget specifically for research, development, or R&D plant.

Each agency should include in the reporting of obligations or outlays the amounts transferred to other agencies for support of research and development. The receiving agencies are not to report funds transferred to them. Similarly, a subdivision of an agency that transfers funds to another subdivision within that agency reports such obligations or outlays as its own.

Obligations and outlays for work performed for an agency in foreign countries should include all funds available to the agency for this purpose, including funds separately appropriated for special foreign currency programs.

III. Research, development, and R&D plant include all direct, incidental, or related costs resulting from, or necessary to, performance of research and development, and costs of R&D plant as defined below, regardless of whether the research and development are performed by a Federal agency (intramurally) or performed by private individuals and organizations under grant or contract (extramurally). Research and development exclude routine product testing, quality control, mapping and surveys, collection of general-purpose statistics, experimental production, and the training of scientific personnel.

A. Research is systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Research is classified as either basic or applied according to the objectives of the sponsoring agency.

In basic research the objective of the sponsoring agency is to gain fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products in mind.

In applied research the objective of the sponsoring agency is to gain knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.

B. Development is systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes. It excludes quality control, routine product testing, and production.

C. Demonstration activities that are part of research or development (i.e., that are intended to prove or to test whether a technology or method does, in fact, work) should be included. Demonstrations intended primarily to make information available about new technologies or methods should not be included.

D. R&D plant (R&D facilities and fixed equipment, such as reactors, wind tunnels, and particle accelerators) includes acquisition of, construction of, major repairs to, or alterations in structures, works, equipment, facilities, or land for use in R&D activities at Federal or non-Federal installations. Excluded from the R&D plant category are expendable or movable equipment (e.g. spectrometers, microscopes) and office furniture and equipment. Also excluded are the costs of pre-design studies (e.g. those undertaken before commitment to a specific facility). These excluded costs should be reported under total conduct of research and development. Obligations for foreign R&D plant are limited to Federal funds for facilities located abroad and used in support of foreign research and development.

IV. Fields of science and engineering in this survey are divided into eight broad field categories, each consisting of a number of detailed fields. The broad fields are life sciences, psychology, physical sciences, environmental sciences, mathematics and computer sciences, engineering, social sciences, and other sciences not elsewhere classified. The term not elsewhere classified (n.e.c.) is to be used for multidisciplinary projects within a broad field and for single-discipline projects for which a separate field has not been assigned. The following listing presents the fields grouped under each of the broad fields together with illustrative disciplines. (Additional information concerning fields of science and engineering is provided on page 17 under Reporting Guidelines for tables III, IV, and V).

A. Life sciences consist of five detailed fields: biological (excluding environmental), environmental biology, agricultural, medical, and life sciences not elsewhere classified. The illustrative disciplines provided below under each of these detailed fields are intended to be guidelines, not sharp definitions; they represent examples of disciplines generally classified under each detailed field. A discipline under one detailed field may be classified under another detailed field when the major emphasis is elsewhere. Research in biochemistry could be reported as biological, agricultural, or medical, depending on the orientation of the project. Human biochemistry would be classified under biological, but animal biochemistry or plant biochemistry would be under agricultural. In no case should the research be reported under more than one field. No double counting is intended or allowed.

Biological (excluding environmental):

anatomy; biochemistry; biology; biometry and biostatistics; biophysics; botany; cell biology; entomology and parasitology; genetics; microbiology; neuroscience (biological); nutrition; physiology; zoology; other biological, n.e.c.

Environmental biology:

ecosytem sciences; evolutionary biology; limnology; physiological ecology; population biology; population and biotic community ecology; systematics; other environmental biology, n.e.c.

Agricultural:

agronomy; animal sciences; food science and technology; fish and wildlife; forestry; horticulture; plant sciences; soils and soil science; phytopathology; phytoproduction; agriculture, general; other agriculture, n.e.c.

Medical:

internal medicine; neurology; obstetrics and gynecology; ophthalmology; otolaryngology; pediatrics; preventive medicine; pathology; pharmacology; psychiatry; radiology; surgery; dentistry; pharmacy; veterinary medicine; other medical, n.e.c.

Life sciences, n.e.c.

B. Psychology deals with behavior, mental processes, and individual and group characteristics and abilities. Psychology is divided into three categories: biological aspects, social aspects, and psychological sciences not elsewhere classified. Examples of the disciplines under each of these fields are as follows:

Biological aspects:

experimental psychology; animal behavior; clinical psychology; comparative psychology; ethology

Social aspects:

social psychology; educational, personnel, vocational psychology, and testing; industrial and engineering psychology; development and personality

Psychological sciences, n.e.c.

C. Physical sciences are concerned with understanding of the material universe and its phenomena. They comprise the fields of astronomy, chemistry, physics, and physical sciences not elsewhere classified. Examples of disciplines under each of these fields are as follows:

Astronomy:

laboratory astrophysics; optical astronomy; radio astronomy; theoretical astrophysics; X-ray, Gamma-ray, neutrino astronomy

Chemistry:

inorganic; organo-metallic; organic; physical

Physics:

acoustics; atomic and molecular; condensed matter; elementary particle; nuclear structure; optics; plasma

Physical sciences, n.e.c.

D. Environmental sciences (terrestrial and extraterrestrial) are concerned with the gross nonbiological properties (with one exception) of the areas of the solar system that directly or indirectly affect man's survival and welfare; they comprise the fields of atmospheric sciences, geological sciences, oceanography, and environmental sciences not elsewhere classified. The one exception is that obligations for studies pertaining to life in the sea or other bodies of water are to be reported as support of oceanography and not biology. Examples of disciplines under each of these fields are as follows:

Atmospheric sciences:

aeronomy; solar; weather modification; extraterrestrial atmospheres; meteorology

Geological sciences:

engineering geophysics; general geology; geodesy and gravity; geomagnetism; hydrology; inorganic geochemistry; isotopic geochemistry; organic geochemistry; laboratory geophysics; paleomagnetism; paleontology; physical geography and cartography; seismology; soil sciences

Oceanography:

biological oceanography; chemical oceanography; physical oceanography; marine geophysics

Environmental sciences, n.e.c.

E. Mathematics and computer sciences employ logical reasoning with the aid of symbols and are concerned with the development of methods of operation employing such symbols, and in the case of computer sciences, with the application of such methods to automated information systems. Examples of disciplines under these fields are as follows:

Mathematics:

algebra; analysis; applied mathematics; foundations and logic; geometry; numerical analysis; statistics; topology

Computer sciences:

programming languages; computer and information sciences (general); design, development, and application of computer capabilities to data storage and manipulation; information sciences and systems; systems analysis

Mathematics and computer sciences, n.e.c.

F. Engineering is concerned with studies directed toward developing engineering principles or toward making specific principles usable in engineering practice. Engineering is divided into eight fields: aeronautical, astronautical, chemical, civil, electrical, mechanical, metallurgy and materials, and engineering not elsewhere classified. Examples of disciplines under each of these fields are as follows:

Aeronautical:

aerodynamics

Astronautical:

aerospace; space technology

Chemical:

petroleum; petroleum refining; process

Civil:

architectural; hydraulic; hydrologic; marine; sanitary and environmental; structural; transportation

Electrical:

communication; electronic; power

Mechanical:

engineering mechanics

Metallurgy & materials:

ceramic; mining; textile; welding

Engineering, n.e.c.

agricultural; bioengineering; biomedical; industrial and management; nuclear; ocean engineering; systems

G. Social sciences are directed toward an understanding of the behavior of social institutions and groups and of individuals as members of a group. Social sciences include anthropology, economics, political science, sociology, and social sciences not elsewhere classified. Examples of disciplines under the fields of social science are as follows:

Anthropology:

archaeology; cultural and personality; social and ethnology; applied anthropology

Economics:

econometrics and economic statistics; history of economic thought; international economics; industrial, labor and agricultural economics; macroeconomics; microeconomics; public finance and fiscal policy; theory; economic systems and development

Political science:

area or regional studies; comparative government; history of political ideas; international relations and law; national political and legal systems; political theory; public administration

Sociology:

comparative and historical; complex organizations; culture and social structure; demography; group interactions; social problems and social welfare; sociological theory

Social sciences, n.e.c.

linguistics; research in education; research in history; socioeconomic geography; research in law, e.g., attempts to assess impact on society of legal systems and practices

H. Other sciences, n.e.c.: To be used for multidisciplinary and interdisciplinary projects that cannot be classified within one of the broad fields of science above.

V. A performer is either an intramural group or organization carrying out an operational function or an extramural organization or person receiving support or providing services under a contract or grant.

A. Intramural performers are the agencies of the Federal Government. Their work is carried on directly by agency personnel. Obligations reported under this category are for activities performed or to be performed by the reporting agency itself, or they represent funds that the agency transfers to another Federal agency for performance of work as long as the ultimate performer is that agency or any Federal agency. If the ultimate performer is not a Federal agency, the funds so transferred are to be reported by the transferring agency under the appropriate extramural performer category (industrial firms, universities and colleges, or other nonprofit institutions).

NOTE: Intramural activities cover costs associated with the planning and administration of intramural and extramural programs by Federal personnel as well as actual intramural R&D performance. Intramural activities also include the costs of supplies and equipment, essentially of an "off-the-shelf" nature, that are procured for use in intramural research and development. For example, the purchase from an extramural source of an operational launch vehicle (i.e., one that has gone beyond the development or prototype stage) that is used for intramural performance of research and development should be reported as a part of the cost of intramural research and development.

B. Extramural performers are organizations outside the Federal sector that perform with Federal funds under contract or grant. Only those costs associated with actual R&D performance should be reported, but these would include costs of materials and supplies to carry out R&D activities. Note, however, that the costs of "off-the-shelf" supplies and equipment procured from extramural suppliers that are required to support intramural research and development should be considered as part of the costs of intramural performance and not as part of the costs of extramural performance.

Extramural performers are identified as follows:

1. Industrial firms: Those organizations that may legally distribute net earnings to individuals or to other organizations.

2. Universities and colleges: Institutions engaged primarily in providing resident and/or accredited instruction for at least a 2-year program above the secondary school level. Included are colleges of liberal arts; schools of arts and sciences; professional schools, as in engineering and medicine, including affiliated hospitals and associated research institutes; and agricultural experiment stations.

3. Other nonprofit institutions: Private organizations other than educational institutions no part of whose net earnings inure to the benefit of a private stockholder or individual, and other private organizations organized for the exclusive purpose of turning over their entire net earnings to such nonprofit organizations.

4. Federally funded research and development centers (FFRDC's): FFRDC's do not have a prescribed organizational structure. They can range from the traditional contractor-owned/contractor-operated or Government-owned/contractor-operated (GOCO) organizational structures to various degrees of contractor/ Government control and ownership. In general, however, all of the following criteria should be met before an activity is identified as an FFRDC (See page 24 for list):

   a. Performs, analyzes, integrates, supports (non-financial) and/or manages basic research, applied research, and/or development. (Activities primarily engaged in routine quality control and testing, routine service activities, production, mapping and surveys, and information dissemination are specifically excluded from FFRDC designation).

   b. Performance of the functions in (a) above is either upon the direct request of the Government or under a broad charter from the Government, but in either case the results are directly monitored by the Government. However, the monitoring shall not be such as to create a personal services relationship, or to cause disruptions that are detrimental to the productivity and/or quality of the FFRDC's work.

   c. The majority of the activity's financial support (70% or more) is received from the Government with a single agency usually predominating in that financial support.

d. In general, most or all of the facilities are owned by the Government or funded, under contract, by the Government.

e. The activity is operated, managed and/or administered by either a university or consortium of universities, other nonprofit organization or industrial firm as an autonomous organization or as an identifiable separate operating unit of a parent organization.

f. A long term relationship evidenced by specific agreement exists or is expected to exist between the operator, manager, or administrator of the activity and its primary sponsor.

In addition to the above criteria, the relationship between the activity and the Government should exhibit the following characteristics in order to qualify for FFRDC identification:

a. The activity (organization and/or facilities) is brought into existence at the initiative of a Government agency or bureau to meet some special research or development need which, at the time, cannot be met as effectively by existing in-house or contractor resources.

b. Work from other than a sponsoring agency is undertaken only to the extent permitted by the sponsoring agency and in accordance with the procedures of the sponsoring agency.

c. The activity, whether the operator of its own or a Government-owned facility, has access, beyond that which is common to the normal contractual relationship, to Government and/or supplier data, employees, and facilities needed to discharge its responsibilities efficiently and effectively, whether the data is sensitive/proprietary or not.

d. The primary sponsor undertakes the responsibility to assure a reasonable continuity in the level of support to the activity consistent with the agency's need for the activity and the terms of the sponsoring agreement.

e. The activity is required to conduct its business in a responsible manner befitting its special relationship with the Government, to operate in the public interest free from organizational conflict of interest, and to disclose its affairs (as an FFRDC) to the primary sponsor.

5. State and local governments: State and local government agencies, excluding State or local universities and colleges, agricultural experiment stations, medical schools, and affiliated hospitals. (Federal R&D funds obligated directly to such State and local institutions should be included under the universities-and-colleges category in this report.) Research and development activities under the State-and-local category are performed either by the State or local agencies themselves or by other organizations under grants or contracts from such agencies. Regardless of the ultimate performer, Federal R&D funds directed to State and local governments are to be reported under this sector and no other.

6. Foreign performers: Foreign citizens, foreign organizations, or foreign governments, as well as international organizations, such as NATO, UNESCO, WHO, performing work abroad financed by the Federal Government. Excluded are U.S. agencies, organizations, or citizens performing research and development abroad for the Federal Government; the survey does not seek information on "off-shore" payments. An exception is made in the case of U.S. citizens performing research and development abroad under special foreign currency funds; these activities are included under foreign performers. Foreign scientists performing in the United States are excluded, however.

7. Private individuals: In the case of an R&D grant or contract awarded directly to a private individual, place obligations incurred under "industrial firms."

INSTRUCTIONS FOR REPORTING OBLIGATIONS AND OUTLAYS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT

REPORTING GUIDELINES

Shuttle data: These figures (located in the columns indicated with astericks on the enclosed tables) are the estimates provided by agencies for fiscal years 1985 and 1986 in last year's survey (Federal Funds, XXXIV). They are included in the present survey for purposes of comparison. If there are important differences (increases or decreases) between the current report and last year's report for fiscal years 1985 and 1986 explain the reasons in the narrative section of PCSURVEY.

Cost coverage: Obligations and outlays reported should reflect full costs. In addition to costs of specific scientific projects, applicable overhead costs should also be included.

Thus, the amounts reported should include the costs of planning and administration of both intramural and extramural R&D programs, laboratory overhead, pay of military personnel, and departmental administration.

Character of work: Classifying research and development on the basis of the character of the work, i.e., basic research, applied research, or development, may present problems. It may be necessary in some cases to employ a measure of judgment in distributing obligations among categories. In cases where an overlap exists, funds should be assigned to the category most appropriate to the principal type of work supported.

Intramural transfer of funds: A Federal agency that transfers funds to another Federal agency for the support of research and development should report such obligations or outlays as its own. The receiving agency is not to report, for purposes of this survey, on funds transferred to it from another agency. A subdivision of an agency that transfers funds to another subdivision within that agency should also report such obligations or outlays as its own.

To assure that no undue distortion of funds for intramural performance of research and development takes place, the agency transferring the funds should make a special effort, within practical limits, to determine whether the ultimate performer is intramural or extramural and report accordingly. The transfer of funds to another Federal agency should not be the sole basis for reporting that the R&D performance is intramural.

Table I is for reporting outlays only.

Table II is for reporting obligations only. Obligations shown in items 5 and 6 of table II should be identified by appropriation titles and program activities as part of the descriptive narrative.

Tables III, IV, and V are for the reporting of obligations for research by field of science.

> Definitions and a guide relating to fields of science are provided on pages 4 through 15, although the examples provided for the disciplines are not intended as a complete enumeration. Every effort should be made to allocate obligations to a specific discipline rather than to the "not elsewhere classified (n.e.c.)" category. If specific allocation is not feasible, however, obligations reported under the n.e.c. category should be identified in an explanatory note. In reporting obligations for activities concerned with interdisciplinary studies funds must not be double-counted.

Tables VI, VII, and VIII cover reporting of obligations by performer. Definitions of performers appear on pages 12 to 15. Item 2 is for identification of obligations for intramural personnel services and related allowances, as defined in OMB Circular A-34, Section 25.1A. Such obligations cover salaries for scientists and engineers and other intramural support personnel, including planning and administrative personnel.

> Items 4, 6, and 8 are for identification of obligations to federally funded research and development centers (FFRDC's) appearing on Table IX and on the list of FFRDC's (pages 24 to 26). Each agency should report obligations to each FFRDC that it uses that appears on that list, even though the FFRDC may be sponsored by another agency. Obligations to FFRDC's administered by university consortia should be included in the amounts under item 6.
>
> Agencies may not unilaterally delete organizations classified as FFRDC's from the list or add organizations thereto. Inquiries concerning additions or deletions to the list of FFRDC's should be directed to William L. Stewart, Director, Division of Science Resources Studies, National Science Foundation. Additional information concerning FFRDC's is provided on pages 13 and 14 under General Concepts and Definitions, and in Reporting Guidelines for Table IX.

Item 9 is for identification of obligations to State and local government agencies for R&D activities financed by the Federal Government.

Item 11 is for identification of obligations for R&D performance by foreign individuals or foreign organizations (including international organizations in foreign countries) that is financed by Federal agencies. Obligations made with funds separately appropriated for special foreign currency programs should be included in the totals for foreign obligations (item 11) and separately identified in item 12. These special foreign currencies are derived largely from funds provided under Public Law 480, 1954, as amended. Care should be taken to report foreign performance only once. For example, if a foreign performer is an educational institution, obligations to that institution should be reported only under foreign performance and not also under universities and colleges.

Table IX provides for reporting additional information on fiscal year 1985 R&D and R&D plant obligations to FFRDC's. This table requires the breakdown of obligations for research and development reported in items 4, 6, and 8 of table VI by each FFRDC listed. This table also requires the breakdown by individual FFRDC of obligations for R&D plant reported in items 3, 5, and 7 of table XI for FY 1985. Each agency should report obligations to each FFRDC it supports, even though the FFRDC is sponsored by another agency. Pages 24 to 26 provide a list of FFRDC's by sponsoring agency and administering organization.

Table X. Countries included in each geographic area are as follows:

Europe: All countries of continental Europe and the British Isles. Excluded are Greece and Turkey, which are classified under the Near East.

Near East: Greece, Iran, Iraq, Israel, Jordan, Lebanon, Saudi Arabia, Sudan, Turkey, and Egypt.

Asia: All countries of continental Asia and Japan, the Philippines, Sumatra, and Borneo. Excluded are Iran, Iraq, Israel, Jordan, Lebanon, and Saudi Arabia, which are included under the Near East.

Africa: All countries of continental Africa except Egypt and the Sudan, which are under the Near East.

Latin America: All countries of continental South America, Central America, the Caribbean, and Mexico.

Note that for table X, data for fiscal years 1986 and 1987 are not required.

Table XI provides for reporting obligations for R&D plant by the performer of research and development that the R&D plant supports regardless of the plant's ownership or location.

Under item 1 report obligations for R&D plant that are provided to support research and development performed intramurally.

Under item 2 report obligations for R&D plant that are provided to support research and development by industrial firms excluding FFRDC's.

Under item 3 report the amount obligated for R&D plant that is provided to support research and development performed by FFRDC's administered by industrial firms.

Under items 4 and 5 report obligations for R&D plant that are provided to support R&D performance by universities and colleges excluding FFRDC's and those that are provided to support university-administered FFRDC's.

Under items 6 and 7 report the same information for nonprofit performers.

Under item 8 report obligations for R&D plant that are provided to support research and development performed by State and local governments.

Under item 10 report obligations for R&D plant located abroad that are provided to support foreign research and development.

Note that the performer of research and development determines the classification of R&D plant obligations.

Tables A and B. Data are to be provided by the Departments of Agriculture, Commerce, Defense, Energy, the Interior, Transportation, and Health and Human Services; the Environmental Protection Agency; the National Aeronautics and Space Administration; and the National Science Foundation.

Definitions that were provided earlier in these instructions for research and development, R&D plant, and performers apply to these tables.

* Tables A and B are to be used for reporting the geographic distribution of FY 1985 obligations for research and development (table A) and R&D plant (table B) by State and performer or performer supported. The performer categories are provided in each table.

- R&D obligations to foreign performers or R&D plant obligations in support of foreign performers should not be reported.

- In table A the obligations for research and for development should be provided as a combined amount.

- Both intramural and extramural obligations are required. The extramural obligations are to be reported in terms of prime contracts or grants.

- The principal location (State, outlying area, etc.) where the work was performed by the prime contractor, grantee, or intramural organization should be used as the basis of reporting. Where this information is not available in existing records, the obligations should be assigned to the State, outlying area, etc. where the principal plant or operational center of the prime contractor, grantee, or intramural organization was located.

- The amounts reported in these tables for each performer should add to the totals reported for tables VI and XI of the Federal Funds survey.

Tables C, D, and E. Data for these tables are to be provided by the Departments of Agriculture, Defense, Energy, and Health and Human Services; the National Aeronautics and Space Administration; and the National Science Foundation.

Definitions for basic research, applied research, total research, universities and colleges, and field of science and engineering that were provided earlier in these instructions apply to these tables also.

- The total obligations reported in tables C, D, and E must equal obligations for basic research, applied research, and the combined obligations for basic and applied research reported for item 5 of tables VI, VII, and VIII of the survey.

- The shuttle data provided in the areas of tables C and D enclosed by astericks represent estimates provided by agencies for fiscal years 1985 and 1986 in last year's survey (Federal Funds, Volume XXXIV). Shuttle data are included for purposes of comparison. If there are significant differences (increases or decreases) in the distribution among the fields of science and engineering between the current report and last year's report for fiscal years 1985 and 1986, explain the reasons in the narrative section.

NARRATIVE STATEMENTS

Sheets are provided as worksheets for reporting a description of the content and objectives of the research, development, and R&D plant programs being supported in fiscal years 1985, 1986, and 1987, prior to being entered in the narrative section of PCSURVEY.

Respondents are requested to identify R&D and R&D plant obligations by appropriation title and by program activity or subactivity within each appropriation, as shown in The Budget, Fiscal Year 1987.

For each program activity or subactivity the R&D and R&D plant obligations should be given for fiscal years 1985, 1986, and 1987.

In addition, brief descriptions should be provided of the research and development or R&D plant construction supported under each program activity or subactivity, including reasons for increases or decreases during the 3-year period.

Respondents are encouraged to confer with the staff of the National Science Foundation in the development of descriptive material on programs.

RELATIONSHIP TO THE OFFICE OF MANAGEMENT AND BUDGET ANALYSIS

In response to Office of Management and Budget (OMB) Circular No. A-11 (Section 44, Exhibit 44, revised July 1984), agencies provide OMB with data on their obligations and outlays for research and development by character of work and R&D plant. They also provide data on R&D obligations and outlays to universities and colleges. OMB publishes some of these data in the budget document, Special Analyses, Budget of the United States Government. This document includes a report on the R&D portion of the budget, but in its coverage of R&D data it does not provide as much detail on character of work or performers as Federal Funds and provides no information on fields of science or geographic distribution. Both the Federal Funds report and the OMB report, however, use the same general definitions and guidelines. Therefore, for the overall amounts reported for total research or development for distribution by character of work, and for R&D plant, both Federal Funds and OMB should be the same.

If there are differences between the R&D data submitted for the Federal Funds report and for the OMB report, each reporting agency or subdivision should provide an explanation for differences in total R&D obligations, basic research obligations, and R&D obligations to universities and colleges.

RELATIONSHIP TO (CASE) SURVEY ON FEDERAL OBLIGATIONS TO INDIVIDUAL UNIVERSITIES AND COLLEGES FOR FY 1985

The following agencies have been requested to provide data to the Federal Support to Universities (CASE) survey: the Departments of Agriculture, Commerce, Defense, Education, Energy, Housing and Urban Development, the Interior , Health and Human Services, Labor, State (AID), and Transportation; the Environmental Protection Agency; the National Aeronautics and Space Administration; the National Science Foundation; and the Nuclear Regulatory Commission.

These agencies have been requested to provide specific obligational data for fiscal year 1985 to NSF in response to the reporting system established in 1965 by the Committee on Academic Science and Engineering (CASE) of the Federal Council for Science and Technology; this survey is referred to in these instructions as the Federal Support to Universities (CASE) survey. The requested data cover obligations for research and development and R&D plant to universities and colleges and to FFRDC's administered by universities as well as data on other activities. In general the concepts and definitions used in the Federal Support to Universities (CASE) survey conform with the general guidelines in the annual Federal Funds survey. Thus, for agencies participating in both surveys, overall totals for research and development and R&D plant to universities and colleges and also to FFRDC's administered by universities should be substantially the same. Where differences appear in data reported for the two surveys, each reporting agency or subdivision should provide an explanation for the differences.

Different totals can sometimes result from the fact that for the Federal Funds survey and the Federal Support to Universities (CASE) survey reporting is accomplished in different ways. For the Federal Funds survey each agency includes in its reporting the amounts transferred to other agencies for furtherance of its own purposes; the receiving agencies do no report funds transferred to them. In the Federal Support to Universities (CASE) survey, however, the data are reported by the agencies in terms of individual performing institutions, and because of this requirement, only the agency that makes the final distribution of the funds can readily determine where the transferred or reimbursable funds are obligated. For this reason agencies reporting to the Federal Support to Universities (CASE) survey include funds received from other agencies and exclude funds transferred to other agencies, the reverse of the procedure for the Federal Funds survey.

FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS

The following is a list of the centers to be used in providing information for tables VI, VII, VIII, IX, and XI. The list is arranged by sponsoring agency and administering organization. Respondents will report under the FFRDC category funds obligated to centers identified on this list.

DEPARTMENT OF DEFENSE

Office of the Secretary of Defense

Administered by other nonprofit institutions:

Institute for Defense Analyses (IDA), Arlington, Va.

Logistics Management Institute (LMI), Bethesda, Maryland

Office of the Secretary of Defense/Office of the Joint Chief of Staff (RAND Corporation 2/), Santa Monica, Calif.

Department of the Navy

Administered by other nonprofit institutions:

Center for Naval Analyses (Hudson Institute), Arlington, Va.

Department of the Air Force

Administered by universities and colleges:

Lincoln Laboratory (Massachusetts Institute of Technology), Lexington, Mass.

Software Engineering Institute (Carnegie Mellon University), Pittsburgh, Pennsylvania

Administered by other nonprofit institutions:

Aerospace Corporation, El Segundo, Calif.

C-3 I Division (MITRE Corporation 1/), Bedford, Mass.

Project Air Force (RAND Corporation 2/), Santa Monica, Calif.

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Administered by industrial firms:

Frederick Cancer Research Facility (Program Resources, Inc.), Frederick, Md.

DEPARTMENT OF ENERGY

Administered by industrial firms:

Bettis Atomic Power Laboratory (Westinghouse-Electric Corp.), Pittsburgh, Pa.

Hanford Engineering Development Laboratory (Westinghouse-Hanford Corp.), Richland, Wash.

Idaho National Engineering Laboratory (EG&G Idaho, Inc.; Exxon Nuclear Idaho Co.; Argonne National Laboratory, West; Westinghouse Electric Corp.), Idaho Falls, Idaho

Knolls Atomic Power Laboratory (General Electric Company), Schenectady, N.Y.

Energy Technology Engineering Center (Rockwell International Corporation), Canoga Park, Calif.

Oak Ridge National Laboratory (Martin Marietta Corp.), Oak Ridge, Tennessee

Sandia National Laboratories (Western Electric Co., Inc. -- Sandia Corp.), Albuquerque, N.M.

Savannah River Laboratory (E.I. du Pont de Nemours & Co., Inc.), Aiken, S.C.

Administered by universities and colleges:

Ames Laboratory (Iowa State University of Science and Technology), Ames, Iowa

Argonne National Laboratory (University of Chicago and Argonne Universities Assn.), Argonne, Ill.

Brookhaven National Laboratory (Associated Universities, Inc.), Upton, Long Island, N.Y.

E.O. Lawrence Berkeley Laboratory (University of California), Berkeley, Calif.

E.O. Lawrence Livermore National Laboratory (University of California), Livermore, Calif.

Fermilab (Universities Research Association, Inc.), Batavia, Ill.

Los Alamos National Laboratory (University of California), Los Alamos, N.M.

Oak Ridge Associated Universities, Oak Ridge, Tenn.

Plasma Physics Laboratory (Princeton University), Princeton, New Jersey

Stanford Linear Accelerator Center (Stanford University), Stanford, Calif.

Administered by other nonprofit institutions:

Pacific Northwest Laboratory (Battelle Memorial Institute), Richland, Wash.

Solar Energy Research Institute (Midwest Research Institute), Golden, Colorado

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Administered by universities and colleges:

Jet Propulsion Laboratory (California Institute of Technology), Pasadena, Calif.

NATIONAL SCIENCE FOUNDATION

Administered by universities and colleges:

National Astronomy and Ionosphere Center (Cornell University), Arecibo, Puerto Rico

National Center for Atmospheric Research (University Corporation for Atmospheric Research), Boulder, Colorado

National Optical Astronomy Observatory (Association of Universities for Research in Astronomy, Inc. 3/), Tucson, Arizona

National Radio Astronomy Observatory (Associated Universities, Inc.), Green Bank, West Virginia

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1/ Only the C3-I Division of the MITRE Corporation should be reported as a FFRDC. All other agency support to MITRE should be reported under "other nonprofit institutions excluding FFRDC's."

2/ Only the Project Air Force and the Office of the Secretary of Defense/Office of the Joint Chief of Staff portions of the RAND Corporation should be reported as an FFRDC. All other agency support to RAND should be reported under "other nonprofit institutions excluding FFRDC's."

3/ As of February, 1984 this center incorporates four divisions, three of which were formerly separate FFRDC's -- Cerro Tololo Inter-American Observatory, Kitt Peak National Observatory, and the National Solar Observatory (formerly Sacramento Peak Observatory). The fourth division, the Advanced Development Program Division is located in Tucson, Arizona and is a new entity with primary responsibility for advanced research in the development of large telescopes.

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TABLE I

Outlays for research and development and R&D plant fiscal years 1985, 1986, and 1987

(Dollars in thousands)

1

Item	R&D AND R&D PLANT	FY1985		FY1986		FY1987
		FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Estimate	FF XXXV Estimate
	Research & development					
1	Total, research & development.......					
	R&D plant					
2	Total, R&D plant..					
0	Total research & development and R&D plant.........					
3	R&D plant as % of item 0...........	%	%	%	%	%

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TABLE II

Summary of obligations for research and development and R&D plant fiscal years 1985, 1986, and 1987

(Dollars in thousands)

2

Item	CHARACTER OF WORK	FY1985		FY1986		FY1987
		FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Estimate	FF XXXV Estimate
1	Basic research....					
	As % of item 5..	%	%	%	%	%
2	Applied research..					
	As % of item 5..	%	%	%	%	%
3	Total research 1/.					
	As % of item 5..	%	%	%	%	%
4	Development.......					
	As % of item 5..	%	%	%	%	%
5	Total research & development.....					
6	Total R&D plant...					
	As % of item 0..	%	%	%	%	%
0	Total research & development and R&D plant...					

1/ Basic research plus applied research equals total research.

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TABLE III

Obligations for basic, applied, and total research by field of science and engineering, fiscal year 1985

(Dollars in thousands)

3

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research		Applied research		Total research 1/	
		FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual
		**************		**************		**************	
100000	Life sciences, total............	* *		* *		* *	
103020	Biological (excl. envrmtl.) ...	* *		* *		* *	
103040	Environmental biology..........	* *		* *		* *	
103060	Agricultural..................	* *		* *		* *	
106000	Medical.......................	* *		* *		* *	
109000	Life sciences, n.e.c. 2/......	* *		* *		* *	
200000	Psychology, total..............	* *		* *		* *	
201000	Biological aspects............	* *		* *		* *	
202000	Social aspects................	* *		* *		* *	
209000	Psychological sci., n.e.c.	* *		* *		* *	
300000	Physical sciences, total........	* *		* *		* *	
301000	Astronomy.....................	* *		* *		* *	
302000	Chemistry.....................	* *		* *		* *	
303000	Physics.......................	* *		* *		* *	
309000	Physical sciences, n.e.c. 2/...	* *		* *		* *	
400000	Environmental sciences, total....	* *		* *		* *	
401000	Atmospheric...................	* *		* *		* *	
402000	Geological....................	* *		* *		* *	
403000	Oceanography..................	* *		* *		* *	
409000	Environmental sci., n.e.c. 2/..	* *		* *		* *	
		**************		**************		**************	

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TABLE III (cont.)

______3

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research		Applied research		Total research 1/	
		FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual
500000	Mathematics and computer sciences, total..................	************** * * * *		************** * * * *		************** * * * *	
501000	Mathematics....................	* * * *		* * * *		* * * *	
502000	Computer sciences..............	* * * *		* * * *		* * * *	
509000	Math. & compt. sci., n.e.c. 2/.	* * * *		* * * *		* * * *	
600000	Engineering, total...............	* * * * * *		* * * * * *		* * * * * *	
601000	Aeronautical..................	* * * *		* * * *		* * * *	
602000	Astronautical.................	* * * *		* * * *		* * * *	
603000	Chemical......................	* * * *		* * * *		* * * *	
604000	Civil.........................	* * * *		* * * *		* * * *	
605000	Electrical....................	* * * *		* * * *		* * * *	
606000	Mechanical....................	* * * *		* * * *		* * * *	
607000	Metallurgy and materials.......	* * * *		* * * *		* * * *	
609000	Engineering, n.e.c. 2/.........	* * * *		* * * *		* * * *	
700000	Social sciences, total...........	* * * * * *		* * * * * *		* * * * * *	
701000	Anthropology..................	* * * *		* * * *		* * * *	
702000	Economics.....................	* * * *		* * * *		* * * *	
705000	Political science..............	* * * *		* * * *		* * * *	
706000	Sociology.....................	* * * *		* * * *		* * * *	
709000	Social sciences, n.e.c. 2/.....	* * * *		* * * *		* * * *	
800000	Other sciences, n.e.c. 2/.......	* * * *		* * * *		* * * *	
000000	Total, all fields 3/	* * * * **************		* * * * **************		* * * * **************	

1/ Basic research plus applied research equals total research.
2/ Not elsewhere classified.
3/ Totals equal items 1, 2, and 3, respectively, in table II for 1985 for basic res., applied res., and total res.

TABLE IV

Obligations for basic, applied, and total research by field of science and engineering, fiscal year 1986

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(Dollars in thousands)

4

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research		Applied research		Total research 1/	
		FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate
		**************		**************		**************	
100000	Life sciences, total	* * * *		* * * *		* * * *	
103020	Biological (excl. envrmtl.) ...	* * * *		* * * *		* * * *	
103040	Environmental biology	* * * *		* * * *		* * * *	
103060	Agricultural	* * * *		* * * *		* * * *	
106000	Medical	* * * *		* * * *		* * * *	
109000	Life sciences, n.e.c. 2/	* * * *		* * * *		* * * *	
200000	Psychology, total	* * * * * *		* * * * * *		* * * * * *	
201000	Biological aspects	* * * *		* * * *		* * * *	
202000	Social aspects	* * * *		* * * *		* * * *	
209000	Psychological sci., n.e.c.	* * * *		* * * *		* * * *	
300000	Physical sciences, total	* * * * * *		* * * * * *		* * * * * *	
301000	Astronomy	* * * *		* * * *		* * * *	
302000	Chemistry	* * * *		* * * *		* * * *	
303000	Physics	* * * *		* * * *		* * * *	
309000	Physical sciences, n.e.c. 2/	* * * *		* * * *		* * * *	
400000	Environmental sciences, total	* * * * * *		* * * * * *		* * * * * *	
401000	Atmospheric	* * * *		* * * *		* * * *	
402000	Geological	* * * *		* * * *		* * * *	
403000	Oceanography	* * * *		* * * *		* * * *	
409000	Environmental sci., n.e.c. 2/	* * * *		* * * *		* * * *	
		**************		**************		**************	

T A B L E IV (cont.)

4

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research		Applied research		Total research 1/	
		FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate
500000	Mathematics and computer sciences, total	************** * * * *		************** * * * *		************** * * * *	
501000	Mathematics	* * * *		* * * *		* * * *	
502000	Computer sciences	* * * *		* * * *		* * * *	
509000	Math. & compt. sci., n.e.c. 2/	* * * *		* * * *		* * * *	
600000	Engineering, total	* * * * * *		* * * * * *		* * * * * *	
601000	Aeronautical	* * * *		* * * *		* * * *	
602000	Astronautical	* * * *		* * * *		* * * *	
603000	Chemical	* * * *		* * * *		* * * *	
604000	Civil	* * * *		* * * *		* * * *	
605000	Electrical	* * * *		* * * *		* * * *	
606000	Mechanical	* * * *		* * * *		* * * *	
607000	Metallurgy and materials	* * * *		* * * *		* * * *	
609000	Engineering, n.e.c. 2/	* * * *		* * * *		* * * *	
700000	Social sciences, total	* * * * * *		* * * * * *		* * * * * *	
701000	Anthropology	* * * *		* * * *		* * * *	
702000	Economics	* * * *		* * * *		* * * *	
705000	Political science	* * * *		* * * *		* * * *	
706000	Sociology	* * * *		* * * *		* * * *	
709000	Social sciences, n.e.c. 2/	* * * *		* * * *		* * * *	
800000	Other sciences, n.e.c. 2/	* * * *		* * * *		* * * *	
000000	Total, all fields 3/	* * * * **************		* * * * **************		* * * * **************	

1/ Basic research plus applied research equals total research.
2/ Not elsewhere classified.
3/ Totals equal items 1, 2, and 3, respectively, in table II for 1986 for basic res., applied res., and total res.

TABLE V

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Obligations for basic, applied, and total research
by field of science and engineering, fiscal year 1987

(Dollars in thousands)

______ 5

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research FF XXXV Estimate	Applied research FF XXXV Estimate	Total research 1/ FF XXXV Estimate
100000	Life sciences, total............			
103020	Biological (excl. envrmtl.) ...			
103040	Environmental biology..........			
103060	Agricultural....................			
106000	Medical.........................			
109000	Life sciences, n.e.c. 2/......			
200000	Psychology, total...............			
201000	Biological aspects............			
202000	Social aspects................			
209000	Psychological sci., n.e.c.			
300000	Physical sciences, total.........			
301000	Astronomy......................			
302000	Chemistry......................			
303000	Physics........................			
309000	Physical sciences, n.e.c. 2/...			
400000	Environmental sciences, total....			
401000	Atmospheric....................			
402000	Geological.....................			
403000	Oceanography..................			
409000	Environmental sci., n.e.c. 2/..			

TABLE V (cont.)

5

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research	Applied research	Total research 1/
		FF XXXV Estimate	FF XXXV Estimate	FF XXXV Estimate
500000	Mathematics and computer sciences, total................			
501000	Mathematics..................			
502000	Computer sciences.............			
509000	Math. & compt. sci., n.e.c. 2/.			
600000	Engineering, total..............			
601000	Aeronautical.................			
602000	Astronautical................			
603000	Chemical.....................			
604000	Civil........................			
605000	Electrical...................			
606000	Mechanical...................			
607000	Metallurgy and materials.......			
609000	Engineering, n.e.c. 2/........			
700000	Social sciences, total..........			
701000	Anthropology.................			
702000	Economics....................			
705000	Political science.............			
706000	Sociology....................			
709000	Social sciences, n.e.c. 2/....			
800000	Other sciences, n.e.c. 2/.......			
000000	Total, all fields 3/			

1/ Basic research plus applied research equals total research.
2/ Not elsewhere classified.
3/ Totals equal items 1, 2, and 3, respectively, in table II for 1987 for basic research, applied research, and total research.

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TABLE VI

Obligations for research and development by performer and character of work fiscal year 1985

(Dollars in thousands)

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6

Item	PERFORMER	Basic research		Applied research		Development	
		FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual
01	Federal intramural 1/						
	As % of total (item 00)	%	%	%	%	%	%
02	Personnel costs 2/	( )	( )	( )	( )	( )	( )
03	Indust. firms excl. FFRDC's 3/...						
	As % of total (item 00)	%	%	%	%	%	%
04	FFRDC's 3/ adm. by indust. firms.						
	As % of total (item 00)	%	%	%	%	%	%
05	Univ. & coll., excl. FFRDC's 3/..						
	As % of total (item 00)	%	%	%	%	%	%
06	FFRDC's 3/ adm. by univ. & coll..						
07	Nonprofit inst. excl. FFRDC's 3/.						
08	FFRDC's 3/ adm. by nonprof. inst.						
09	State and local governments						
10	Total, all domestic performers ..						
11	Foreign 4/						
12	Amount of item 11 supported by separate appropriations for "spec. foreign currency prog.".	( )	( )	( )	( )	( )	( )
00	Total, all performers 5/						

1/ For each total (basic research, applied research or development), there must be an entry for item 1 (Federal intramural). Even if all work is performed extramurally, the costs associated with the planning and administration of such programs by Federal personnel must be reported.

2/ Amount of item 1 for personnel costs.

3/ Federally funded research and development centers. (See instructions for list.)

4/ See instructions for definition of foreign performers.

5/ Totals equal items 1, 2, and 4, respectively, in table II for 1985 for basic research, applied res., and development.

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T A B L E VII

Obligations for research and development by performer and character of work fiscal year 1986

(Dollars in thousands)

7

Item	PERFORMER	Basic research		Applied research		Development	
		FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate
01	Federal intramural 1/						
	As % of total (item 00)	%	%	%	%	%	%
02	Personnel costs 2/	( )	( )	( )	( )	( )	( )
03	Indust. firms excl. FFRDC's 3/...						
	As % of total (item 00)	%	%	%	%	%	%
04	FFRDC's 3/ adm. by indust. firms.						
	As % of total (item 00)	%	%	%	%	%	%
05	Univ. & coll., excl. FFRDC's 3/..						
	As % of total (item 00)	%	%	%	%	%	%
06	FFRDC's 3/ adm. by univ. & coll..						
07	Nonprofit inst. excl. FFRDC's 3/.						
08	FFRDC's 3/ adm. by nonprof. inst.						
09	State and local governments						
10	Total, all domestic performers ..						
11	Foreign 4/						
12	Amount of item 11 supported by separate appropriations for "spec. foreign currency prog.".	( )	( )	( )	( )	( )	( )
00	Total, all performers 5/						

1/ For each total (basic research, applied research or development), there must be an entry for item 1 (Federal intramural). Even if all work is performed extramurally, the costs associated with the planning and administration of such programs by Federal personnel must be reported.
2/ Amount of item 1 for personnel costs.
3/ Federally funded research and development centers. (See instructions for list.)
4/ See instructions for definition of foreign performers.
5/ Totals equal items 1, 2, and 4, respectively, in table II for 1986 for basic research, applied res., and development.

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TABLE VIII

Obligations for research and development by performer and character of work fiscal year 1987

(Dollars in thousands)

8

Item	PERFORMER	Basic research	Applied research	Development
		FF XXXV Estimate	FF XXXV Estimate	FF XXXV Estimate
01	Federal intramural 1/			
	As % of total (item 00)	%	%	%
02	Personnel costs 2/	( )	( )	( )
03	Indust. firms excl. FFRDC's 3/...			
	As % of total (item 00)	%	%	%
04	FFRDC's 3/ adm. by indust. firms.			
	As % of total (item 00)	%	%	%
05	Univ. & coll., excl. FFRDC's 3/..			
	As % of total (item 00)	%	%	%
06	FFRDC's 3/ adm. by univ. & coll..			
07	Nonprofit inst. excl. FFRDC's 3/.			
08	FFRDC's 3/ adm. by nonprof. inst.			
09	State and local governments			
10	Total, all domestic performers ..			
11	Foreign 4/			
12	Amount of item 11 supported by separate appropriations for "spec. foreign currency prog.".	( )	( )	( )
00	Total, all performers 5/			

1/ For each total (basic research, applied research or development), there must be an entry for item 1 (Federal intramural). Even if all work is performed extramurally, the costs associated with the planning and administration of such programs by Federal personnel must be reported.
2/ Amount of item 1 for personnel costs.
3/ Federally funded research and development centers. (See instructions for list.)
4/ See instructions for definition of foreign performers.
5/ Totals equal items 1, 2, and 4, respectively, in table II for 1987 for basic research, applied res., and development.

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TABLE IX

Obligations for research and development and R&D plant at individual federally funded research and development centers, fiscal year 1985

(Dollars in thousands)

9

Federally funded research and development centers (FFRDC's). (Report obligations for any FFRDC used by respondent agency.)	R&D obligations	R&D plant obligations
Administered by industrial firms:		
Bettis Atomic Power Laboratory (Westinghouse Electric Corp.), Pittsburgh, PA..................		
Frederick Cancer Research Facility (Program Resources, Inc.), Frederick, MD..................		
Hanford Engineering Development Laboratory (Westinghouse-Hanford Corp.), Richland, WA.......		
Oak Ridge National Laboratory (Martin Marietta Corp.), Oak Ridge, TN..................		
Idaho National Engineering Laboratory (EG&G Idaho, Inc.), Idaho Falls, ID..............		
Knolls Atomic Power Laboratory (General Electric Company), Schenectady, NY...............		
Energy Technology Engineering Center (Rockwell International Corporation), Canoga Park, CA......		
Sandia National Laboratories (Western Electric Co., Inc.-Sandia Corp.), Albuquerque, NM.............		
Savannah River Laboratory (E.I. du Pont de Nemours & Co., Inc.), Aiken, SC..............		
Total	1/	2/
Administered by universities and colleges:		
Ames Laboratory (Iowa State University of Science and Technology), Ames, IA................		
Argonne National Laboratory (University of Chicago and Argonne Universities Assn.), Argonne, IL.....		
Brookhaven National Laboratory (Associated Universities, Inc.), Upton, Long Island, NY......		
E.O. Lawrence Berkeley Laboratory (University of California), Berkeley, CA.........		
E.O. Lawrence Livermore National Laboratory (University of California), Livermore, CA........		
Fermilab (Universities Research Association, Inc.), Batavia, IL.............................		
Jet Propulsion Laboratory (California Institute of Technology), Pasadena, CA.........................		

TABLE IX (cont.)

9

Federally funded research and development centers (FFRDC's). (Report obligations for any FFRDC used by respondent agency.)	R&D obligations	R&D plant obligations
Administered by universities and colleges (cont.):		
Lincoln Laboratory (Massachusetts Institute of Technology), Lexington, MA..................		
Los Alamos National Laboratory (University of California), Los Alamos, NM.......		
National Astronomy and Ionosphere Center (Cornell University), Arecibo, PR...............		
National Center for Atmospheric Research (University Corporation for Atmospheric Research), Boulder, CO.......................		
National Optical Astronomy Observatory (Association of Universities for Research in Astronomy, Inc.), Tucson, AZ 3/..............		
National Radio Astronomy Observatory (Associated Universities, Inc.), Green Bank, WV..		
Oak Ridge Associated Universities, Oak Ridge, TN................................		
Plasma Physics Laboratory (Princeton University), Princeton, NJ............		
Software Engineering Institute (Carnegie Mellon University), Pittsburgh, PA.....................		
Stanford Linear Accelerator Center (Stanford University), Stanford, CA.......................		
Total	4/	5/
Administered by other nonprofit institutions:		
Aerospace Corporation, El Segundo, CA.............		
Center for Naval Analyses (Hudson Institute), Arlington, VA................................		
Institute for Defense Analyses (IDA), Arlington, VA................................		
Logistics Management Institute (LMI), Bethesda, MD..................................		
C3-I Division (MITRE Corp.), 6/ Bedford, MA....................................		
Office of the Secretary for Defense/Office of the Joint Chief of Staff (RAND Corp.), Wash., DC 7/..		
Pacific Northwest Laboratory (Battelle Memorial Institute) Richland, WA...............		
Project Air Force (RAND Corporation), 7/ Santa Monica, CA..............................		
Solar Energy Research Institute (Midwest Research Institute), Golden, CO................		
Total	8/	9/

9

1/ Totals equal combined obligations for basic research, applied research, and development, as reported in item 4 of table VI.

2/ Totals equal item 3 of table XI for 1985.

3/ As of February, 1984 this center incorporates four divisions, three of which were formerly separate FFRDC's - Cerro Tololo Inter-American Observatory, Kitt Peak National Observatory, and the National Solar Observatory (formerly Sacramento Peak Observatory). The fourth division, the Advanced Development Program Division is located in Tucson, Arizona and is a new entity with primary responsibility for advanced research in the development of large telescopes.

4/ Totals equal combined obligations for basic research, applied research, and development, as reported in item 6 of table VI.

5/ Totals equal item 5 of table XI for 1985.

6/ Only the C3 Division of the MITRE Corporation should be reported as an FFRDC. All other agency support to MITRE should be reported under "other nonprofit institutions excluding FFRDC's."

7/ Only the Project Air Force and the Office of the Secretary for Defense/Office of the Joint Chief of Staff portions of the RAND Corp. should be reported as FFRDC's. All other agency support to RAND should be reported under "other nonprofit institutions excluding FFRDC's."

8/ Totals equal combined obligations for basic research, applied research, and development, as reported in item 8 of table VI.

9/ Totals equal item 7 of table XI for 1985.

Note: Each supporting agency should report obligations to each FFRDC it uses even though the FFRDC may be under the sponsorship of another agency. See instructions for list of FFRDC's shown by sponsoring agency and administering organization.

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TABLE X

Obligations for basic research and total research and development to foreign performers 1/ by geographic area and country, fiscal year 1985

(Dollars in thousands)

10

Code	GEOGRAPHIC AREA AND COUNTRY	Basic research only 2/	Total research and development 3/
010000	Europe, total		
010100	Austria		
010200	Belgium		
010300	Denmark		
010400	Finland		
010500	France		
010600	Iceland		
010700	Ireland		
010800	Italy		
010900	Netherlands		
011000	Norway		
011100	Poland		
011200	Portugal		
011300	Spain		
011400	Sweden		
011500	Switzerland		

1/ See instructions for definition of a foreign performer. 2/ Total of cols. equals basic res. in item 11 in table VI.

3/ Total of columns equals the sum of basic research, applied research, and development in item 11 in table VI.

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TABLE X (cont.)

Obligations for basic research and total research and development to foreign performers 1/ by geographic area and country, fiscal year 1985

(Dollars in thousands)

10

Code	GEOGRAPHIC AREA AND COUNTRY	Basic research only 2/	Total research and development 3/
011600	United Kingdom, total		
011610	England		
011620	Scotland		
011630	Bermuda		
011640	Other United Kingdom ...		
011700	West Germany		
011800	Yugoslavia		
011900	Other Europe		
020000	Asia, total		
020100	Burma		
020200	Cambodia		
020300	Hong Kong		
020400	India		
020500	Indonesia		
020600	Japan		
020700	South Korea		
020800	Malaysia		
020900	Pakistan		
021000	Philippines		
021100	Taiwan		
021200	Thailand		
021400	Other Asia		

1/ See instructions for definition of a foreign performer. 2/ Total of cols. equals basic res. in item 11 in table VI.
3/ Total of columns equals the sum of basic research, applied research, and development in item 11 in table VI.

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T A B L E X (cont.)

Obligations for basic research and total research and development to foreign performers 1/ by geographic area and country, fiscal year 1985

(Dollars in thousands)

10

Code	GEOGRAPHIC AREA AND COUNTRY	Basic research only 2/	Total research and development 3/
030000	Near East, total		
030100	Greece		
030200	Israel		
030300	Jordan		
030400	Lebanon		
030500	Syria		
030600	Turkey		
030700	Egypt		
030800	Other Near East		
040000	Africa, total		
040100	Kenya		
040200	Liberia		
040300	Nigeria		
040400	Sudan		
040500	Uganda		
040600	Union of South Africa		
040700	Other Africa		

1/ See instructions for definition of a foreign performer. 2/ Total of cols. equals basic res. in item 11 in table VI.
3/ Total of columns equals the sum of basic research, applied research, and development in item 11 in table VI.

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TABLE X (cont.)

Obligations for basic research and total research and development to foreign performers 1/ by geographic area and country, fiscal year 1985

(Dollars in thousands)

10

Code	GEOGRAPHIC AREA AND COUNTRY	Basic research only 2/	Total research and development 3/
050000	Latin America, total		
050100	Argentina		
050200	Bolivia		
050300	Brazil		
050400	Chile		
050500	Colombia		
050600	Costa Rica		
050700	Ecuador		
050800	El Salvador		
050900	Mexico		
051000	Panama		
051100	Peru		
051200	Uruguay		
051300	Venezuela		
051400	Other Latin America		
060000	Australia		
070000	Canada		
080000	New Zealand		
090000	International organizations		
000000	Total, all areas & organiz.		

1/ See instructions for definition of a foreign performer. 2/ Total of cols. equals basic res. in item 11 in table VI.
3/ Total of columns equals the sum of basic research, applied research, and development in item 11 in table VI.

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TABLE XI

Obligations for R&D plant by performer of research and development supported fiscal years 1985, 1986, and 1987

(Dollars in thousands)

________11

Item	PERFORMER OF RESEARCH AND DEVELOPMENT SUPPORTED	FY 1985		FY 1986		FY 1987
		FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Estimate	FF XXXV Estimate
01	Fed. intramural...	*		*		
02	Industr. firms, excl. FFRDC's 1/	*		*		
03	FFRDC's 1/ adm. by industr. firms....	*		*		
04	Univer. & colleges excl. FFRDC's 1/	*		*		
05	FFRDC's 1/ adm. by univer. & coll..	*		*		
06	Nonprofit inst. excl. FFRDC's 1/	*		*		
07	FFRDC's 1/ adm. by nonprofit inst..	*		*		
08	State and local government......	*		*		
09	Total, all domes. performers......	*		*		
10	Foreign 2/........	*		*		
00	Total, all performers 3/...	*		*		

1/ Federally funded research and development centers.
2/ See instructions for definition of foreign R&D plant.
3/ Equals item 6 of table II.

Table A. Obligations for research and development, by State and performer, fiscal year 1985

(Dollars in thousands)

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A

CODE NO.	State 1/	Federal intramural	Industrial firms excluding FFRDC's */	FFRDC's */ admin. by industrial firms	Univ. and colleges excluding FFRDC's */	FFRDC's */ admin. by univ. and colleges	Other nonprofit institut. excluding FFRDC's */	FFRDC's */ admin. by other nonprofit institut.	State and local govern - ments
00000	Total	2/	3/	4/	5/	6/	7/	8/	9/
10061	ALABAMA								
11091	ALASKA								
12081	ARIZONA								
13071	ARKANSAS								
14092	CALIFORNIA								
15082	COLORADO								
16011	CONNECTICUT								
17051	DELAWARE								
18052	DIST.OF COLUMBIA								
19053	FLORIDA								
20054	GEORGIA								
21093	HAWAII								
22083	IDAHO								
23031	ILLINOIS								
24032	INDIANA								
25041	IOWA								
26042	KANSAS								
27062	KENTUCKY								
28072	LOUISIANA								
29012	MAINE								

Table A. Obligations for research and development, by State and performer, fiscal year 1985 (cont.)

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(Dollars in thousands)

A

CODE NO.	State 1/	Federal intramural 2/	Industrial firms excluding FFRDC's */ 3/	FFRDC's */ admin. by industrial firms 4/	Univ. and colleges excluding FFRDC's */ 5/	FFRDC's */ admin. by univ. and colleges 6/	Other nonprofit institut. excluding FFRDC's */ 7/	FFRDC's */ admin. by other nonprofit institut. 8/	State and local govern - ments 9/
30055	MARYLAND								
31013	MASSACHUSETTS								
32033	MICHIGAN								
33043	MINNESOTA								
34063	MISSISSIPPI								
35044	MISSOURI								
36084	MONTANA								
37045	NEBRASKA								
38085	NEVADA								
39014	NEW HAMPSHIRE								
40021	NEW JERSEY								
41086	NEW MEXICO								
42022	NEW YORK								
43056	NORTH CAROLINA								
44046	NORTH DAKOTA								
45034	OHIO								
46073	OKLAHOMA								
47094	OREGON								
48023	PENNSYLVANIA								
49015	RHODE ISLAND								

Table A. Obligations for research and development, by State and performer, fiscal year 1985 (cont.)

(Dollars in thousands)

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A

CODE NO.	State 1/	Federal intramural 2/	Industrial firms excluding FFRDC's */ 3/	FFRDC's */ admin. by industrial firms 4/	Univ. and colleges excluding FFRDC's */ 5/	FFRDC's */ admin. by univ. and colleges 6/	Other nonprofit institut. excluding FFRDC's */ 7/	FFRDC's */ admin. by other nonprofit institut. 8/	State and local govern - ments 9/
50057	SOUTH CAROLINA								
51047	SOUTH DAKOTA								
52064	TENNESSEE								
53074	TEXAS								
54087	UTAH								
55016	VERMONT								
56058	VIRGINIA								
57095	WASHINGTON								
58059	WEST VIRGINIA								
59035	WISCONSIN								
60088	WYOMING								
61100	OUTLYING AREAS								
62200	OFFICES ABROAD								

*/ Federally funded research and development centers.
1/ Under Outlying Areas include Puerto Rico and the Panama Canal Zone as well as U.S. Territories and possessions. Under Offices Abroad include obligations for research and development performed and/or administered abroad by the U.S. Government.
2/ Total equals combined obligations for basic res., applied res., and dev., as reported in item 1, table VI, of the survey.
3/ Total equals combined obligations for basic res., applied res., and dev., as reported in item 3, table VI, of the survey.
4/ Total equals combined obligations for basic res., applied res., and dev., as reported in item 4, table VI, of the survey.
5/ Total equals combined obligations for basic res., applied res., and dev., as reported in item 5, table VI, of the survey.
6/ Total equals combined obligations for basic res., applied res., and dev., as reported in item 6, table VI, of the survey.
7/ Total equals combined obligations for basic res., applied res., and dev., as reported in item 7, table VI, of the survey.
8/ Total equals combined obligations for basic res., applied res., and dev., as reported in item 8, table VI, of the survey.
9/ Total equals combined obligations for basic res., applied res., and dev., as reported in item 9, table VI, of the survey.

Table B. Obligations for R&D plant, by State and performer of research and development supported, fiscal year 1985

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(Dollars in thousands)

B

CODE NO.	State 1/	Federal intramural	Industrial firms excluding FFRDC's */	FFRDC's */ admin. by industrial firms	Univ. and colleges excluding FFRDC's */	FFRDC's */ admin. by univ. and colleges	Other nonprofit institut. excluding FFRDC's */	FFRDC's */ admin. by other nonprofit institut.	State and local govern - ments
00000	Total	2/	3/	4/	5/	6/	7/	8/	9/
10061	ALABAMA								
11091	ALASKA								
12081	ARIZONA								
13071	ARKANSAS								
14092	CALIFORNIA								
15082	COLORADO								
16011	CONNECTICUT								
17051	DELAWARE								
18052	DIST.OF COLUMBIA								
19053	FLORIDA								
20054	GEORGIA								
21093	HAWAII								
22083	IDAHO								
23031	ILLINOIS								
24032	INDIANA								
25041	IOWA								
26042	KANSAS								
27062	KENTUCKY								
28072	LOUISIANA								
29012	MAINE								

Table B. Obligations for R&D plant, by State and performer of research and development supported, fiscal year 1985 (cont.)

(Dollars in thousands)

OMB No. 3145-0006
Interagency Report Control
No. 1155 NSF-AN

B

CODE NO.	State 1/	Federal intramural	Industrial firms excluding FFRDC's */	FFRDC's */ admin. by industrial firms	Univ. and colleges excluding FFRDC's */	FFRDC's */ admin. by univ. and colleges	Other nonprofit institut. excluding FFRDC's */	FFRDC's */ admin. by other nonprofit institut.	State and local governments
		2/	3/	4/	5/	6/	7/	8/	9/
30055	MARYLAND								
31013	MASSACHUSETTS								
32033	MICHIGAN								
33043	MINNESOTA								
34063	MISSISSIPPI								
35044	MISSOURI								
36084	MONTANA								
37045	NEBRASKA								
38085	NEVADA								
39014	NEW HAMPSHIRE								
40021	NEW JERSEY								
41086	NEW MEXICO								
42022	NEW YORK								
43056	NORTH CAROLINA								
44046	NORTH DAKOTA								
45034	OHIO								
46073	OKLAHOMA								
47094	OREGON								
48023	PENNSYLVANIA								
49015	RHODE ISLAND								

Table B. Obligations for R&D plant, by State and performer of research and development supported, fiscal year 1985 (cont.)

OMB No. 3145-0006
Interagency Report Control
No. 1155 NSF-AN

(Dollars in thousands)

B

CODE NO.	State 1/	Federal intramural 2/	Industrial firms excluding FFRDC's */ 3/	FFRDC's */ admin. by industrial firms 4/	Univ. and colleges excluding FFRDC's */ 5/	FFRDC's */ admin. by univ. and colleges 6/	Other nonprofit institut. excluding FFRDC's */ 7/	FFRDC's */ admin. by other nonprofit institut. 8/	State and local govern - ments 9/
50057	SOUTH CAROLINA								
51047	SOUTH DAKOTA								
52064	TENNESSEE								
53074	TEXAS								
54087	UTAH								
55016	VERMONT								
56058	VIRGINIA								
57095	WASHINGTON								
58059	WEST VIRGINIA								
59035	WISCONSIN								
60088	WYOMING								
61100	OUTLYING AREAS								
62200	OFFICES ABROAD								

*/ Federally funded research and development centers.
1/ Under Outlying Areas include Puerto Rico and the Panama Canal Zone as well as U.S. territories and possessions. Under Offices Abroad incl. obligations for R&D plant located abroad but used in support of R&D performed by agencies of the U.S. Government.
2/ Total equals item 1, table XI, for FY 1985 of the survey.
3/ Total equals item 2, table XI, for FY 1985 of the survey.
4/ Total equals item 3, table XI, for FY 1985 of the survey.
5/ Total equals item 4, table XI, for FY 1985 of the survey.
6/ Total equals item 5, table XI, for FY 1985 of the survey.
7/ Total equals item 6, table XI, for FY 1985 of the survey.
8/ Total equals item 7, table XI, for FY 1985 of the survey.
9/ Total equals item 8, table XI, for FY 1985 of the survey.

OMB No. 3145-0006
Interagency Report Control
No. 1155 NSF-AN

TABLE C

Obligations for basic, applied, and total research performed at universities and colleges, by field of science and engineering, fiscal year 1985

(Dollars in thousands)

C

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research		Applied research		Total research 1/	
		FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual
100000	Life sciences, total						
103020	Biological (excl. envrmtl.)						
103040	Environmental biology						
103060	Agricultural						
106000	Medical						
109000	Life sciences, n.e.c. 2/						
200000	Psychology, total						
201000	Biological aspects						
202000	Social aspects						
209000	Psychological sci., n.e.c.						
300000	Physical sciences, total						
301000	Astronomy						
302000	Chemistry						
303000	Physics						
309000	Physical sciences, n.e.c. 2/						
400000	Environmental sciences, total						
401000	Atmospheric						
402000	Geological						
403000	Oceanography						
409000	Environmental sci., n.e.c. 2/						

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TABLE C (cont.)

________C

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research		Applied research		Total research 1/	
		FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual	FF XXXIV Estimate	FF XXXV Actual
500000	Mathematics and computer sciences, total................	* *		* *		* *	
501000	Mathematics....................	* *		* *		* *	
502000	Computer sciences..............	* *		* *		* *	
509000	Math. & compt. sci., n.e.c. 2/.	* *		* *		* *	
600000	Engineering, total..............	* *		* *		* *	
601000	Aeronautical...................	* *		* *		* *	
602000	Astronautical..................	* *		* *		* *	
603000	Chemical.......................	* *		* *		* *	
604000	Civil..........................	* *		* *		* *	
605000	Electrical.....................	* *		* *		* *	
606000	Mechanical.....................	* *		* *		* *	
607000	Metallurgy and materials.......	* *		* *		* *	
609000	Engineering, n.e.c. 2/.........	* *		* *		* *	
700000	Social sciences, total..........	* *		* *		* *	
701000	Anthropology...................	* *		* *		* *	
702000	Economics......................	* *		* *		* *	
705000	Political science..............	* *		* *		* *	
706000	Sociology......................	* *		* *		* *	
709000	Social sciences, n.e.c. 2/.....	* *		* *		* *	
800000	Other sciences, n.e.c. 2/.......	* *		* *		* *	
000000	Total, all fields 3/	* *		* *		* *	

1/ Basic research plus applied research equals total research.
2/ Not elsewhere classified.
3/ Totals equal totals for basic research and applied research in item 5, table VI.

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T A B L E D

Obligations for basic, applied, and total research performed at universities and colleges, by field of science and engineering, fiscal year 1986

(Dollars in thousands)

________D

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research		Applied research		Total research 1/	
		FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate
		**************		**************		**************	
100000	Life sciences, total............	* *		* *		* *	
103020	Biological (excl. envrmtl.) ...	* *		* *		* *	
103040	Environmental biology..........	* *		* *		* *	
103060	Agricultural..................	* *		* *		* *	
106000	Medical.......................	* *		* *		* *	
109000	Life sciences, n.e.c. 2/.......	* *		* *		* *	
200000	Psychology, total..............	* *		* *		* *	
201000	Biological aspects............	* *		* *		* *	
202000	Social aspects................	* *		* *		* *	
209000	Psychological sci., n.e.c.	* *		* *		* *	
300000	Physical sciences, total........	* *		* *		* *	
301000	Astronomy.....................	* *		* *		* *	
302000	Chemistry.....................	* *		* *		* *	
303000	Physics.......................	* *		* *		* *	
309000	Physical sciences, n.e.c. 2/...	* *		* *		* *	
400000	Environmental sciences, total....	* *		* *		* *	
401000	Atmospheric...................	* *		* *		* *	
402000	Geological....................	* *		* *		* *	
403000	Oceanography..................	* *		* *		* *	
409000	Environmental sci., n.e.c. 2/..	* *		* *		* *	
		**************		**************		**************	

TABLE D (cont.)

_________D

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research		Applied research		Total research 1/	
		FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate	FF XXXIV Estimate	FF XXXV Estimate
500000	Mathematics and computer sciences, total................						
501000	Mathematics....................						
502000	Computer sciences..............						
509000	Math. & compt. sci., n.e.c. 2/.						
600000	Engineering, total..............						
601000	Aeronautical...................						
602000	Astronautical..................						
603000	Chemical.......................						
604000	Civil..........................						
605000	Electrical.....................						
606000	Mechanical.....................						
607000	Metallurgy and materials.......						
609000	Engineering, n.e.c. 2/.........						
700000	Social sciences, total..........						
701000	Anthropology...................						
702000	Economics......................						
705000	Political science..............						
706000	Sociology......................						
709000	Social sciences, n.e.c. 2/.....						
800000	Other sciences, n.e.c. 2/.......						
000000	Total, all fields 3/						

1/ Basic research plus applied research equals total research.

2/ Not elsewhere classified.

3/ Totals equal totals for basic research and applied research in item 5, table VII.

OMB No. 3145-0006
Interagency Report Control
No. 1155 NSF-AH

TABLE E

Obligations for basic, applied, and total research performed at universities and colleges by field of science and engineering, fiscal year 1987

(Dollars in thousands)

E

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research	Applied research	Total research 1/
		FF XXXV Estimate	FF XXXV Estimate	FF XXXV Estimate
100000	Life sciences, total............			
103020	Biological (excl. envrmtl.) ...			
103040	Environmental biology..........			
103060	Agricultural...................			
106000	Medical........................			
109000	Life sciences, n.e.c. 2/.......			
200000	Psychology, total..............			
201000	Biological aspects.............			
202000	Social aspects.................			
209000	Psychological sci., n.e.c.			
300000	Physical sciences, total........			
301000	Astronomy......................			
302000	Chemistry......................			
303000	Physics........................			
309000	Physical sciences, n.e.c. 2/...			
400000	Environmental sciences, total....			
401000	Atmospheric....................			
402000	Geological.....................			
403000	Oceanography...................			
409000	Environmental sci., n.e.c. 2/..			

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T A B L E E (cont.)

E

Item	FIELD OF SCIENCE AND ENGINEERING	Basic research	Applied research	Total research 1/
		FF XXXV Estimate	FF XXXV Estimate	FF XXXV Estimate
500000	Mathematics and computer sciences, total................			
501000	Mathematics...................			
502000	Computer sciences.............			
509000	Math. & compt. sci., n.e.c. 2/.			
600000	Engineering, total..............			
601000	Aeronautical..................			
602000	Astronautical.................			
603000	Chemical......................			
604000	Civil.........................			
605000	Electrical....................			
606000	Mechanical....................			
607000	Metallurgy and materials......			
609000	Engineering, n.e.c. 2/........			
700000	Social sciences, total..........			
701000	Anthropology..................			
702000	Economics.....................			
705000	Political science.............			
706000	Sociology.....................			
709000	Social sciences, n.e.c. 2/.....			
800000	Other sciences, n.e.c. 2/.......			
000000	Total, all fields 3/			

1/ Basic research plus applied research equals total research.
2/ Not elsewhere classified.
3/ Totals equal totals for basic research and applied research in item 5, table VIII.

DESCRIPTION OF RESEARCH AND DEVELOPMENT PROGRAMS

Identify below the total R&D obligations shown in item 5 of table II by appropriation title and program activity or subactivity within each appropriation as given in the fiscal year 1987 budget.

For each activity or subactivity give the R&D obligations for fiscal years 1985, 1986, and 1987 and identify within parentheses the portion that is for research only, excluding development.

In addition, provide a brief description of the research and development supported under each activity or subactivity, including reasons for increases or decreases during the 3-year period.

Use the three headings below in providing information.

Use additional sheets, as needed.

Appropriation title and program activity and subactivity	*Brief description of each activity or subactivity*	*R&D obligations for each activity or subactivity: 1985, 1986(est.), 1987(est.)*

DESCRIPTION OF R&D PLANT PROGRAMS

Identify below the total R&D plant obligations shown in item 6 of table II by appropriation title and program activity or subactivity within each account, as given in the fiscal 1987 budget.

For each activity or subactivity give the R&D plant obligations for fiscal years 1985, 1986, and 1987.

In addition, provide a brief description of the R&D plant supported in connection with each activity or subactivity, including reasons for increases or decreases during the 3-year period.

Use the three headings below in providing information.

Use additional sheets, as needed.

Appropriation title and program activity and subactivity	*Brief description of each activity or subactivity*	*R&D obligations for each activity or subactivity:* 1985, 1986(*est.*), 1987(*est.*)

SHUTTLE DESCRIPTIONS

Description of significant differences between data reported for Volume XXXIV and Volume XXXV for fiscal years 1985 and 1986 (Shuttle columns)

(If more space is required, please use additional sheets of paper.)

Table II: Explanation of significant differences in obligation levels for character of work (basic research, applied research, and development) and R&D plant.

FY 85

FY 86

Tables III and IV: Explanation of significant differences in obligation levels for fields of science and engineering.

FY 85

FY 86

Tables VI and VII: Explanation of significant differences in obligation levels for performers.

FY 85

FY 86

RECONCILIATION WITH THE OFFICE OF MANAGEMENT AND BUDGET SPECIAL ANALYSIS OF FEDERAL R&D PROGRAMS

Research and development reconciliation sheet for fiscal years 1985, 1986, and 1987

Relationship of data submitted for Federal Funds XXXV to data reported to the Office of Management and Budget for the special analysis of Federal research and development programs, Budget of the United States Government, FY 1987.

Total research & development obligations	1985	1986(est.)	1987(est.)
		(Dollars in Thousands)	
Obligations for total research and development reported in Federal Funds table II, item 5	$		
Obligations for total research and development reported to OMB in response to Circular No. A-11 (Section 44, Exhibit 44, revised July 1984)	$		
Differences	$		

Explanation of any differences in research and development obligations between the two reports:

Total basic research obligations	1985	1986(est.)	1987(est.)
		(Dollars in Thousands)	
Obligations reported for basic research in Federal Funds, Table II, item 1	$________	________	________
Obligations for basic research reported to OMB in response to Circular No. A-11 (Section 44, Exhibit 44, revised July 1984)	$________	________	________
Differences	$________	________	________

Explanation of any differences in basic research obligations between the two reports:

RECONCILIATION WITH THE OFFICE OF MANAGEMENT AND BUDGET SPECIAL ANALYSIS OF FEDERAL R&D PROGRAMS

Research and development reconciliation sheet for fiscal years 1985, 1986, and 1987

Relationship of data submitted for Federal Funds XXXV to data reported to the Office of Management and Budget for the special analysis of Federal research and development programs, Budget of the United States Government, FY 1987.

Research and development obligations to universities and colleges	1985	1986(est.)	1987(est.)
		(Dollars in Thousands)	
Obligations reported in Federal Funds tables VI, VII and VIII, item 5, universities and colleges, excluding FFRDC's (basic research plus applied research plus development)	$ ________	________	________
Obligations reported to OMB in response to Circular No. A-11 (Section 44, Exhibit 44, revised July 1984)	$ ________	________	________
Differences	$ ________	________	________

Explanation of any differences in research and development obligations to universities and colleges between the two reports:

RECONCILIATION WITH THE FEDERAL SUPPORT TO UNIVERSITIES (CASE) SURVEY 1/

Research and development reconciliation sheet for FY 1985 obligations

Relationship of data submitted for Federal Funds XXXV to data reported to NSF for the survey of Federal obligations to universities and colleges, by individual institutions.

Research and development

(Dollars in Thousands)

Amount reported in Federal Funds table VI, item 5, universities and colleges, excluding federally funded research and development centers (basic research plus applied research plus development) $______________

Amount reported for research and development to universities and colleges (total for all institutions) in the Federal Support to Universities (CASE) survey $______________

Difference $______________

Explanation of any differences in research and development amounts reported between these two surveys:

Amount reported in Federal Funds table VI, item 6, federally funded research and development centers administered by universities and colleges (basic research plus applied research plus development). $__________

Amount reported for research and development to federally funded research and development centers (total for all centers administered by universities and colleges) in the Federal Support to Universities (CASE) survey. $__________

Difference $__________

Explanation of any differences in research and development amounts reported between these two surveys:

1/ To be completed by the following agencies and their subdivisions: The Departments of Agriculture, Commerce, Defense, Education, Energy, Housing and Urban Development, the Interior, Health and Human Services, Labor, State (AID), and Transportation; the Environmental Protection Agency; the National Aeronautics and Space Administration; the National Science Foundation; and the Nuclear Regulatory Commission.

RECONCILIATION WITH THE FEDERAL SUPPORT TO UNIVERSITIES (CASE) SURVEY 1/

R&D plant reconciliation sheet for FY 1985 obligations

Relationship of data submitted for Federal Funds XXXV to data reported to NSF for the survey of Federal obligations to universities and colleges.

R&D plant

(Dollars in Thousands)

Amount reported in Federal Funds table XI, item 4, universities and colleges, excluding federally funded research and development centers.	$ ____________
Amount reported for R&D plant to universities and colleges (total for all institutions) in the Federal Support to Universities (CASE) survey.	$ ____________
Difference	$ ____________

Explanation of any differences in amounts for R&D plant reported between the two surveys:

Amount reported in Federal Funds table XI, item 5, federally funded research and development centers administered by universities and colleges. $__________

Amount reported for R&D plant to federally funded research and development centers (total for all centers administered by universities and colleges) in the Federal Support to Universities (CASE) survey. $__________

Difference $__________

Explanation of any differences in amounts for R&D plant reported between the two surveys:

1/ To be completed by the following agencies and their subdivisions: The Departments of Agriculture, Commerce, Defense, Education, Energy, Housing and Urban Development, the Interior, Health and Human Services, Labor, State (AID), and Transportation; the Environmental Protection Agency; the National Aeronautics and Space Administration; the National Science Foundation; and the Nuclear Regulatory Commission.

SHUTTLE DESCRIPTION FOR TABLES C, D, AND E

Description of significant differences between obligations reported for Volumes XXXIV and XXXV for fiscal years 1985 and 1986 for basic research, applied research, and total research performed at universities and colleges by field of science and engineering.

FY 1985

FY 1986

* Excludes federally funded research and development centers (FFRDC's) administered by universities and colleges.

federal support to universities, colleges, and selected nonprofit institutions

purpose and background

This survey collects data on Federal obligations to individual U.S. universities and colleges; to independent nonprofit institutions; and to federally funded research and development centers (FFRDC's) administered by academic or nonprofit institutions. The interagency system for reporting Federal obligations to universities and colleges was originally established in 1965 under the auspices of the Committee on Academic Science and Engineering (CASE) of the Federal Council for Science and Technology. Since 1968, these data have been collected annually by the National Science Foundation (NSF).

survey instrument

Data collected by this survey include information by agency, by institution, geographic (State) region, and by detailed science and engineering (S/E) field. Data are also collected by type of funding activity, i.e., research and development, research and development (R&D) plant, S/E instructional facilities and equipment, fellowships/traineeships/training grants, other S/E support, and non-S/E activities.

More detailed information about the participating agencies and subagencies, the definitions of the categories of support, S/E fields, and formats used by agencies when submitting data can be found in the annual NSF publication, *Instructions and Specifications for Reporting Federal Support to Universities, Colleges, and Selected Nonprofit Institutions,* copies of which are available from the Division of Science Resources Studies/Government Studies Group.

sample design

This is a federally mandated survey with a universal response rate. Data are supplied by 15 Federal agencies that account for virtually all Federal R&D obligations. Data for nearly 3,000 institutions are available each year, covering almost 2,400 universities and colleges, 16 FFRDC's administered by academia, 530 nonprofit organizations, and 7 FFRDC's administered by nonprofit organizations.

data availability

All data tapes are maintained at the institution level. The exception is that separate totals are maintained for system offices when funds were obligated on a system basis and the funding agency was unable to determine the ultimate distribution of the money within the system's institutions.

The survey is annual and contains Federal support data on individual academic institutions dating from 1963. Data on nonprofit organizations were first collected in 1968. Information on S/E fields is available beginning in 1971.

Most recent data should not be used in time-series with earlier data releases because prior-year data are subsequently updated to reflect modifications submitted by respondent agencies. As of fall 1986, data reported by the Department of Education on "Non-Science/Engineering Activities" in FY's 1979, 1981, 1982, and 1983 had *not* been corrected on an individual institution basis. Amounts shown in this category will, therefore, not add to the adjusted totals shown in the most recent publications.

data access

Summary statistical tables from this survey are available on diskettes prepared for use on an IBM-compatible microprocessor. Inquiries regarding this survey should be addressed to:

Mr. Richard Bennof
Division of Science Resources Studies
Government Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L602
Washington, D.C. 20550
(202) 634-4636

For data users solely interested in current data, an fiscal year (FY) 1986 single-year data tape and an FY's 1978-86 multiyear tape will be available fall 1987. Data for FY's 1971-76 and the 1976 Transition Quarter are available either on single tapes or on one tape containing *all* of these files. A *Data User Guide* has been developed for the multiyear tapes documenting the compatible code structure utilized in NSF's four academic surveys. (See NSF contact listed previously.) Requests for data available on magnetic tape should be addressed to:

Mr. George Nozicka
Quantum Research Corporation
7300 Pearl Street, Suite 210
Bethesda, Maryland 20814
(301) 657-3070

The cost of the multiyear tape is $325 each for the 1976-83 period and/or the 1977-84 period. All multiyear tapes for earlier years are $325 each and all single-year tapes are $100.

Instructions and Specifications

FOR REPORTING FEDERAL SUPPORT TO UNIVERSITIES, COLLEGES, AND SELECTED NONPROFIT INSTITUTIONS

Prepared by the National Science Foundation
October 1986

Interagency Clearance Control Number
1156-NSF-AN
July 31, 1989
OMB Clearance Number
OMB 3145-0006

CHECKLIST FOR DATA SUBMISSION, FY 1986

Please note that this survey program is mandated by Federal law. See "INTRODUCTION" (P. IV) for a specific reference governing the survey's mandate as part of the NSF Act. The National Science Foundation requests that all agency responses be submitted by January 15, 1987. If your agency encounters any problems in preparing the survey response in a timely and accurate manner, we will be happy to provide guidance in the interpretation of the survey requirements. Also, please verify R&D and R&D plant totals with your agency's corresponding totals in the NSF survey *Federal Funds for Research and Development*. See "Introduction" for further details under "Relationship to Federal Funds Survey." Before submitting FY 1986 data to the National Science Foundation, please review your submission to ensure that it conforms to the specifications in this manual. Pay particular attention to the following points, based on problems which have slowed NSF's processing in past years:

1. Submit only one type-1 card per institution supported under a particular agency code (see pp. 7-8). DO NOT submit a separate type-1 card for each project at an institution. Even if several subdivisions of your agency are grouped under the residual ("99") subagency code, you should still submit only one type-1 card per institution under that code.
2. Include in the data for each institution all of its departments, bureaus, offices, and other components (e.g., medical schools, agricultural experiment stations, research institutes, computer centers, etc.) Exclude only those entities listed as Federally Funded Research and Development Centers (FFRDC's) on page 18; these should be reported separately.
3. Be sure to include type-2 card(s) for every academic institution for which the obligations reported on the type-1 card include either research and development (R&D) or fellowships, traineeships, and training grants (FTTG). Please DO NOT exceed 10 type-2 cards per institution without first calling NSF for approval.
4. Note that the list of nonprofit institutions in the 1986 Code Book has once again been expanded. Please report ALL R&D or R&D plant obligations to EACH of these institutions. In addition, any nonprofit institution NOT LISTED in the Code Book that is receiving obligations for research and development and/or R&D plant should be reported. See instructions in Part III for reporting obligations to institutions NOT listed in the Code Book.
5. Use the 1986 Code Book to resolve any questions about institution codes. Note in particular the changes listed in the introduction to the Code Book.
6. Use "System Office" codes only for funds which your agency obligated directly to the central office of a system of universities **AND** for which the ultimate distribution to individual institutions within the system is unobtainable.
7. Report all funding in terms of the immediate recipient, whether or not the funds obligated were later subcontracted.
8. Use only the field of science/engineering codes listed in this manual for type-2 card reporting (see. pp. 15-16).
9. Right-justify all obligation data within the appropriate columns. (Zero-filling is acceptable, but not necessary.)
10. Please note the submission date to NSF of January 15, 1987.

Your assistance in the above matters will be greatly appreciated. The fewer problems encountered with the data submissions, the faster the data can be processed and made available for distribution.

Instructions
and
Specifications

FOR REPORTING FEDERAL SUPPORT TO UNIVERSITIES, COLLEGES, AND SELECTED NONPROFIT INSTITUTIONS

Prepared by the National Science Foundation
October 1986

Interagency Clearance Control Number
1156-NSF-AN
July 31, 1989
OMB Clearance Number
OMB 3145-0006

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INTRODUCTION

Background

The survey of Federal Support to Universities, Colleges, and Selected Nonprofit Institutions originated in 1965, when the Committee on Academic Science and Engineering within the Federal Council for Science and Technology (FCST) established the CASE data collection system for the purpose of reporting annually to the FCST on Federal obligations to academic institutions and associated federally funded research and development centers (FFRDC's). Since 1968 CASE data, as well as data on selected nonprofit institutions, have also served as the basis for an annual report to the President and Congress in accordance with Section 3(a)(7) of the NSF Act as amended in August 1968 which directs the Foundation

> "...to initiate and maintain a program for the determination of the total amount of money for scientific research, including money allocated for the construction of the facilities wherein such research is conducted, received by each educational institution and appropriate nonprofit organization in the United States, by grant, contract, or other arrangement from agencies of the Federal Government, and to report annually thereon to the President and the Congress."

On July 1, 1973, the responsibilities of the National Science Foundation were broadened to include functions previously carried out by the Office of Science and Technology (OST). Among the functions transferred from OST is the responsibility for the maintenance of the reporting system developed by CASE so that the Foundation can continue to fulfill its statutory responsibility to prepare an annual report to the President and Congress as described above.

Scope of Study

This study is designed to collect information from Federal agencies on (1) total program support in thousands of dollars (encompassing both science/engineering and non-science/engineering activities) to academic institutions, (2) total science/engineering support to FFRDC's administered by academic institutions, and (3) R&D support to selected nonprofit institutions and associated FFRDC's. Data should be provided for fiscal year 1986 (October 1, 1985 through September 30, 1986).

The reporting instructions and specifications are divided into three parts, corresponding to the three types of institutions covered by this study:

Part I. Academic Institutions
Part II. FFRDC's Administered by Academic Institutions
Part III. Nonprofit Institutions and FFRDC's Administered by Nonprofit Institutions.

Relationship to Federal Funds Survey

It is intended that for this survey the concepts and definitions will conform as far as possible with corresponding ones in the NSF survey Federal Funds for Research and Development. Totals reported to each of the two studies for R&D and R&D plant obligations to (1) universities and colleges, (2) FFRDC's administered by universities and colleges, and (3) FFRDC's administered by nonprofit institutions, in general, should be in close agreement. **Where differences exist in data reported for the two surveys, each reporting agency should attach to its printout of institutional totals an explanation for the differences, including a statement of the amount for each factor contributing to the difference.** In those cases where such reconciliation is not possible at the time this report is made, departments and agencies will be expected to provide explanations of differences when they report totals for the next Federal Funds survey.

For example, differing totals could result from differing methods of reporting funds that are transferred to another agency before they are distributed to institutions. In this survey, the agency that distributes the funds directly to the institution reports the obligations. Thus, agencies reporting to this study would include funds received from other agencies but would exclude funds transferred to other agencies. For the Federal Funds survey, however, the obligations are reported by the original source of funds, i.e., the agency that transfers the funds to the second agency.

SUBMISSION SPECIFICATIONS

Data submission can be made either by magnetic tape, diskettes, or punchcards. In each case, the data submissions should be accompanied by a printout showing the amounts reported in each record, with agency and subagency totals by type of institution and category of obligation.

The following specifications are applicable to data submitted for parts I, II, and III of the survey:

1. Magnetic Tape Submission

a) Data should be submitted on 9-track tape in extended binary coded decimal interchange code (EBCDIC), compatible with IBM tape drives (e.g., series 3400). Recording density is preferably 1600 bpi, although other densities (800, 6250) are also acceptable.

b) Tape records should be 80 characters in length and should be blocked for efficient reading. Please indicate block size or blocking factor employed on the external tape label. (Suggested blocking: 50 records per block.)

c) Tapes should be unlabelled, with no header or trailer records. If this instruction cannot be followed, please contact Richard J. Bennof of the Foundation's Division of Science Resources Studies on 202-634-4673.

d) An external tape label must be affixed to each tape submitted. The label must show the following information:

(i) Name of submitting agency.

(ii) Fiscal year for which submission is being made (86).

(iii) Type of data (e.g., academic data, academic FFRDC data, nonprofit data, initial submission, supplemental submission, etc.) Note that academic, FFRDC, and nonprofit data may all be submitted together as a single file on one tape, as separate files on one tape, or as separate tapes.

(iv) Tape density, record length, and blocking factor.

2. Punched Card Submission

The standard 80-column punched card is to be used for punchcard reporting. The box or boxes containing the agency punchcard submission should be plainly marked externally with magic marker or other suitable marking so as to provide the following information:

a) Name of submitting agency.

b) Fiscal year for which submission is being made.

c) Type of data (e.g., academic data, academic FFRDC data, nonprofit data, initial submission, supplemental submission, etc.)

d) Total card count for the submission.

e) Sequence number of each box and the total number of boxes submitted, e.g., box 1 of 2.

3. Floppy Disk Submission

a) Data may be submitted on MS-DOS or PC-DOS formatted "double-sided double-density 5.25" diskettes (360K per diskette) in ASCII code.

b) Data records should be 80 characters in length, as above: each record should be followed by a CR-LF (carriage return and line-feed) to indicate the record end.

c) The floppy disks should be externally labeled, as above. Disk sequence, when multiple disks are required, should be indicated. If sufficient agency interest is shown, NSF will provide a data entry program which can be used to enter and edit agency data submissions by using IBM-PC or compatible microcomputers. Call Richard Bennof at 634-4673.

SUBMISSION DUE DATE

Due date for submission of data for parts I, II, and III is now January 15, 1987. Punchcards, diskettes, or magnetic tape with a covering letter or memorandum and printout of data should be sent to:

Richard J. Bennof
Government Studies Group
Division of Science Resources Studies
National Science Foundation
1800 G Street, N.W., L-602
Washington, D.C. 20550

PART I

INSTRUCTIONS FOR ACADEMIC INSTITUTIONS

Reporting Guidelines

Coverage

The universe of academic institutions for this study consists of all institutions of higher education in the United States, its territories, and possessions which offer at least a 1-year program of college-level studies in residence, as shown in the *Code Book for Compatible Statistical Reporting*. Included are all parts of such institutions: Medical schools, hospitals, schools of agriculture, agricultural experiment stations, other research bureaus, etc. All obligations to American universities and colleges should be included, even if the ultimate destination of the funds is known to be outside the United States. Obligations to university-administered federally funded research and development centers (FFRDC's) should be excluded; data for these organizations are to be reported separately on type-3 cards.

Funds obligated directly to a branch campus may be reported separately under the branch code, or aggregated with the main campus, central office, and other branches and reported under the new "all-campus" code. However, to ensure completeness of reporting, it is usually preferable to report for each branch separately where the branch is known; this will minimize the danger that some branches may be inadvertantly overlooked. Such obligations will be merged with data on the rest of the institution before the publication, and only combined data for the institution as a whole will be published. *Obligations* are amounts awarded for grants and contracts during the specified period (October 1, 1985, through September 30, 1986), regardless of when the funds were actually spent. EXCLUDE loan funds, agency support of employee training and development activities, and all forms of indirect support such as funds allocated to State agencies, even if the final destination of such funds is known to be an academic institution.

All data relating to a single institution or branch, regardless of the number of separate grants and/or contracts involved, should be summarized on one type-1 card, identified by institution code, as referred to on p. 9, in the following categories:

1. Research and development
2. Fellowships, traineeships, and training grants
3. R&D plant
4. Facilities and equipment for instruction in science and engineering
5. General support for science and engineering
6. Other activities related to science and engineering
7. All other activities

Items 1 through 6 pertain to science and engineering activities in universities and colleges and constitute academic science/engineering support. Item 7 pertains to federally funded activities in colleges and universities not specifically related to science and engineering. The sum of items 1 through 7 constitutes total Federal support.

For the two categories *research and development* and *fellowships, traineeships, and training grants*, obligations for each institution must be shown separately by field of science/engineering, as shown on pages 15-16.

Submission Requirements

Each agency should submit a deck of punched cards (interpreted) or card images on tape (specifications for submission are given on page v.) The cards (or tape) should be accompanied by:

1. A printout of the punched cards or tape submitted, sorted by institution code. This printout must include agency totals for each of the seven categories of support shown on card 1. USDA, Commerce, DOD, Interior, HHS, DOT, and Education should provide such totals by agency components.

2. A statement of total obligations made by each reporting unit to every institution, sorted by institution code. This total should equal the sum of the seven categories shown on card 1.

It is understood that the submission will be reviewed and verified by each department and agency for conformity to data collection standards and consistency with submissions for previous years.

Card Formats

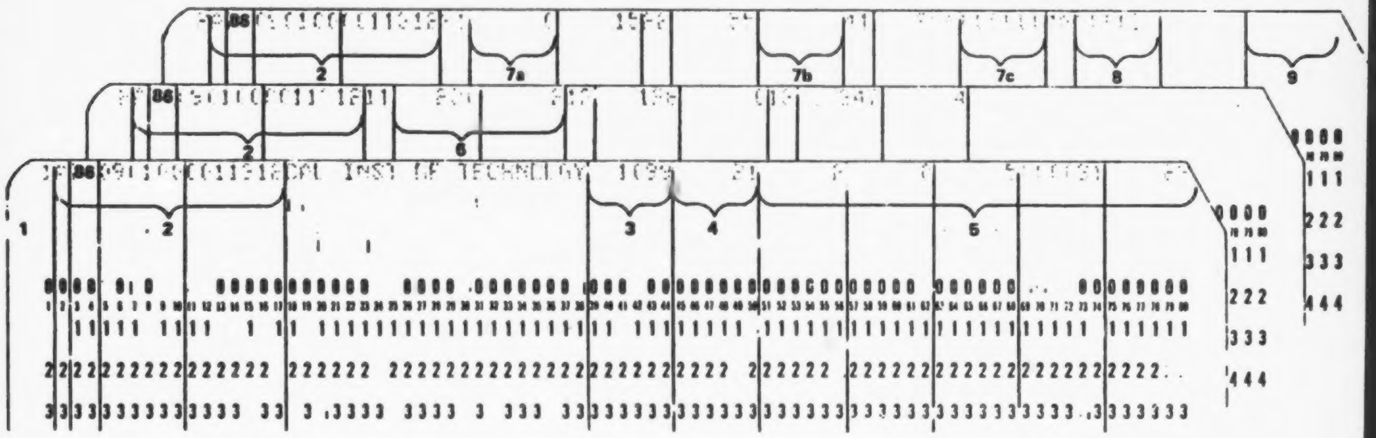
Card formats and sample cards with explanatory notes which may be helpful when preparing the data are shown on the following pages.

Card Formats for Academic Institution Data

Card Type "1"	Action code	FY	Agency code 6	Institution code 7	Institution Name 21	Obligations (thousands of dollars)						
						R&D 6	Fellowships, traineeships, & training grants 6	R&D Plant 6	Facilities & equipment for instruction 6	General support for science/ engineering 6	Other science/ engineering 6	Other activities 6
1	2	86	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	39 40 41 42 43 44	45 46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62	63 64 65 66 67 68	69 70 71 72 73 74	75 76 77 78 79 80

Card Type "2"	Action code	FY	Agency code 6	Institution code 7	Field of Science/Engineering			Field of Science/Engineering			Field of Science/Engineering			Field of Science/Engineering			Blank 7
					FS code	Obligations R&D 6	Obligations Fellowships & traineeships 6	FS code	Obligations R&D 6	Obligations Fellowships & traineeships 6	FS code	Obligations R&D 6	Obligations Fellowships & traineeships 6	FS code	Obligations R&D 6	Obligations Fellowships & traineeships 6	
1	2	86	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19	20 21 22 23 24 25	26 27 28 29 30 31	32 33	34 35 36 37 38 39	40 41 42 43 44 45	46 47	48 49 50 51 52 53	54 55 56 57 58 59	60 61	62 63 64 65 66 67	68 69 70 71 72 73	74 75 76 77 78 79 80

Sample Card-set for Agency Data Submission



NOTES:

1. Column 1 must be 1 or 2, depending on card type involved.
2. Columns 2-17 must be identical for all cards of an institution set, with column 2 coded "A."
3. In the above example, R&D obligations are $1,099,440, punched as 1099 (right-justified).
4. Fellowship, traineeship, and training grant (FTTG) obligations are $20,500, punched as 21 (right-justified).
5. R&D plant (columns 51-56), facilities and equipment for instruction in the sciences and engineering (columns 57-62), general support for science and engineering (columns 63-68), other science and engineering related activities (columns 69-74), and all other activities (columns 75-80) are also in thousands of dollars, with no breakdown by field of science/engineering required.
6. On type-2 cards, field of science/engineering code is followed by two obligation data fields for R&D and FTTG, respectively. Field of science/engineering 11, for example, has R&D obligations of $230,090, punched as 230 (right-justified), and FTTG obligations of $2,395, punched as 2 (right-justified).
7. Zero fields on either type-1 or type-2 cards may be punched with a right-justified zero (7a), left blank (7b), or zero-filled (7c).
8. Data fields in general may have leading blanks, as in most cases shown, or be zero-filled (8).
9. Columns 74-80 are not used on card type 2. Each type-2 card may contain from 1 to 4 field of science/engineering reports.

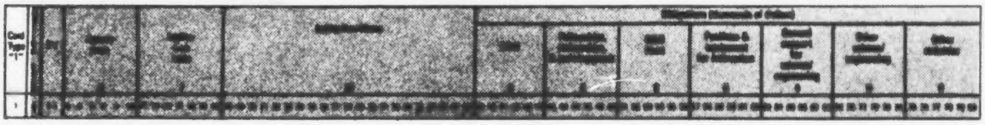
NOTE: Obligations totaling less than $500 for any specific activity (e.g., general support for science and engineering) should be reported as zero (or left blank) on card type 1. In cases where total R&D or FTTG obligations exceed $500, but where each field of science/engineering is less than $500, report the entire amount under the field of science/engineering receiving the largest amount.

Data Element Descriptions

A. CARD TYPE 1

NOTE: Elements 1-5 below also appear on card type 2.

1. CARD TYPE



Definition of Element

The card-type code indicates the format of a card:

Card 1 includes amount obligated for each of seven categories of support at a particular academic institution.

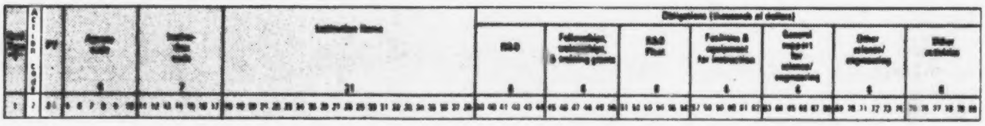
Card 2 indicates a breakdown by applicable field of science/engineering for R&D obligations and for fellowship, traineeship, and training grant obligations.

No breakdown by field of science/engineering is required of any of the other five categories. Thus, no type-2 card should be submitted for an institution receiving only funds falling in those five categories.

Edit-Validation Criteria

1. Card type must be 1 or 2 for academic institution data.
2. Card 2 will be rejected unless accompanied by a card 1 with identical data in columns 2-17. It is preferable to submit cards 1 and 2 in order for each institution.

2. ACTION CODE



Definition of Element

The action code (A) is a data processing control element indicating that a new data submission is to be added to the file of the institution specified. It must appear on all cards in the original submission. If subsequent submissions are necessary, cards should be coded "A," "D," or "R" as appropriate.

Data Submissions and Data Corrections

1. Initial submission:

All records submitted *must* bear action code A. This applies to each card 1 and all associated type-2 cards. Within a single agency/subagency submission, only one type-1 card with action code "A" is allowed for each institution.

2. Corrections:

a. If an entire institution was omitted from the original submission, submit cards 1 and 2 with action code "A."

b. If the obligations to a given institution are to be corrected in any category, submit cards 1 and 2 with just the required corrections. If a given data item was originally reported too low, the correction is normal (positive). If the original data item was too large, the correction should be negative; a minus sign must precede the correction amount (no overpunches). The action code should be "A." Do *not* submit a card 1 correction for R&D or for fellowships, traineeships, and training grants *without* the matching type-2 card(s).

c. If the entire submission to a given institution is to be deleted, submit a card type 1 with action code "D." Only columns 1 through 38 need be filled in. (See 2.e. below.)

d. To replace data previously reported submit card types 1 and 2 with action code "R." Replacement involves erasing all obligations previously submitted for a given institution for the year specified, and then entering the new report as if it were the first submission for that institution.

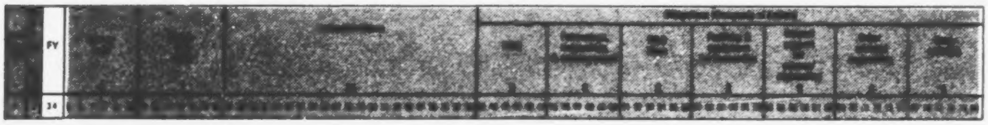
e. Correction cards with action code "A" can usually be processed in a straightforward manner. For cards with code "D" or "R," however, additional information may be required, particularly for past years. Please contact NSF before submitting cards with codes "D" or "R."

Edit-Validation Criteria

1. All records in original submission must have action code "A" in column 2.

2. All records in subsequent submissions with action codes of "D" or "R" must match records in the original submission.

3. FISCAL YEAR



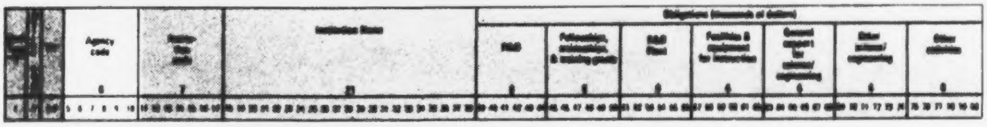
Definition of Element

The fiscal year identifies the time period during which the obligations being reported were made. For FY 1986, this is the period of October 1, 1985, to September 30, 1986. For either original submissions or modifications to an earlier year's reports, code the last two digits of the year in columns 3 and 4.

Edit-Validation Criteria

Columns 3 and 4 must be "86" for fiscal year 1986 data submissions.

4. AGENCY CODE



Definition of Element

The agency code identifies the Federal organization which awarded the grant or contract regardless of the actual source of the funds. In the case of an interagency transfer of funds, the agency which ultimately awards funds to the academic institution is to report the obligation, and the code of this agency is the one entered in columns 5-10.

Valid Codes

All records submitted should carry only the codes shown below. Agencies that wish to use additional codes to show finer breakdowns and to facilitate internal processing of their data should use the 5th and 6th position of agency code field. Before submitting data containing these codes, agencies should furnish NSF a list of codes and the names of offices for which these codes are assigned.

Edit-Validation Criteria

Only agency codes shown below or modified codes furnished to NSF prior to submission of data are accepted.

CODE	
	**Department of Agriculture*
01 01 00	Agricultural Research Service
01 02 00	Economic Research Service
01 03 00	National Agricultural Statistical Service
01 05 00	Forest Service
01 06 00	Cooperative State Research Service
01 07 00	Extension Service
01 08 00	Soil Conservation Service
01 09 00	Agricultural Cooperative Service
01 10 00	Agricultural Marketing Service
01 11 00	Animal and Plant Health Inspection Service
01 12 00	Food Safety and Inspection Service
01 99 00	Other USDA
	**Department of Defense*
02 01 00	Department of the Army
02 02 00	Department of the Navy
02 03 00	Department of the Air Force
02 04 00	Other DOD
	**Department of Health and Human Services*
03 01 00	National Institutes of Health
03 02 00	Health Resources and Services Administration
03 04 00	Alcohol, Drug Abuse, and Mental Health Administration
03 05 00	Centers for Disease Control
03 06 00	Food and Drug Administration
03 10 00	Office of Human Development Services
03 11 00	Health Care Financing Administration
03 12 00	Social Security Administration

CODE	
03 13 00	Office of the Assistant Secretary for Health
03 99 00	Other DHHS
04 00 00	*Department of Energy*
05 00 00	*National Aeronautics and Space Administration*
06 00 00	*National Science Foundation*
	**Department of the Interior*
07 01 00	Office of the Secretary
07 19 00	Minerals Management Service
07 25 00	U.S. Fish and Wildlife Service
07 28 00	National Park Service
07 31 00	Geological Survey
07 32 00	Bureau of Mines
07 41 00	Bureau of Indian Affairs
07 43 00	Bureau of Land Management
07 53 00	Bureau of Reclamation
07 55 00	Office of Surface Mining Reclamation and Enforcement
	**Department of Commerce*
08 02 00	National Bureau of Standards
08 03 00	National Oceanic and Atmospheric Administration
08 05 00	Economic Development Administration
08 99 00	Other Department of Commerce
11 00 00	*Department of Housing and Urban Development*

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*No codes are assigned as data cannot be processed if reported for the agency as a whole.

12 00 00	Agency for International Development
13 00 00	Department of Labor

**Department of Transportation*

14 01 00	U.S. Coast Guard
14 02 00	Federal Aviation Administration
14 03 00	Federal Highway Administration
14 04 00	Federal Railroad Administration
14 05 00	Urban Mass Transportation Adminstration
14 06 00	Maritime Administration
14 07 00	National Highway Traffic Safety Administration
14 08 00	Research and Special Programs Administration
14 09 00	Office of the Secretary

15 00 00	Environmental Protection Agency
17 00 00	Nuclear Regulatory Commission

**Department of Education*

19 01 00	Assistant Secretary for Postsecondary Education
19 02 00	Deputy Undersecretary for Planning, Budget, and Evaluation
19 04 00	Assistant Secretary, Office of Educational Research and Improvement
19 06 00	National Institute of Handicapped Research
19 99 00	Other Department of Education

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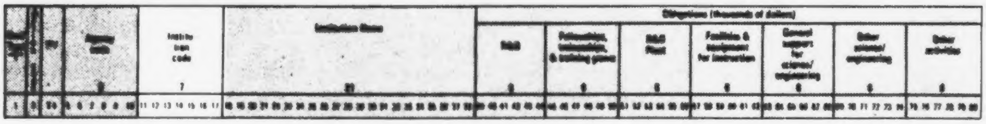
*No codes are assigned as data cannot be processed if reported for the agency as a whole.

5. INSTITUTION CODE



Definition of Element

An academic institution, as defined in the Center for Statistics' *Education Directory, Colleges and Universities, 1985-86*, is one offering at least 1 year of college-level studies leading toward a degree. For purposes of this survey, a college or university consists of all parts of an academic institution—such as a college of liberal arts, a professional school, an affiliated research institute, hospital, school of agriculture, agricultural experiment station, etc.—*except* R&D organizations exclusively or substantially financed by the Federal Government. The latter type of "academic" unit is generally identified as a federally funded research and development center (FFRDC) which, in most instances, was originally established to meet an R&D need of the Federal Government (instructions for reporting data on these centers, together with a list of those currently recognized, are shown in part II).

The academic institutions currently recognized are listed in the *Code Book for Compatible Statistical Reporting of Federal Support to Universities, Colleges, and Selected Nonprofit Institutions*, October 1986. This listing presents a structured universe of U.S. educational institutions in terms of "systems" of institutions, "individual" institutions, and "multi-campus" institutions. For practically every system there is a "system office," the administrative center of the system. For each multi-campus institution there is usually a central office, a main campus, and one or more additional branch campuses, all of which appear under an "all-campus" header. Separate institution codes are provided at all of these levels, and data may be submitted under any of them subject to the qualifications given below.

Codes for "system offices" apply *only* to awards whose final distribution among the institutions comprising the system was not known at the time the award was made. Similarly, the "central office" codes are normally reserved for awards whose eventual distribution among the branches of a particular multi-campus institution was unknown. Although data for the central office, main campus, and other branches of a multi-campus institution may all be reported at the all-campus level, it is usually preferable to report all obligations at the individual branch level where possible, to be sure that no branches have been overlooked.

Agencies are to report funds in terms of the institution directly receiving the support, even if all or part of the project involved is known to have been subcontracted to another institution. However, obligations that flow to a university or college organization acting as a fiscal agent are to be reported in terms of the parent university or college. For example, obligations awarded to the Purdue Research Foundation (fiscal agent) should be reported under Purdue University.

It should be noted that only academic institutions in the United States and its outlying areas are included in this survey; however, all funds to American institutions, whether intended for ultimate use within the United States or abroad, should be reported.

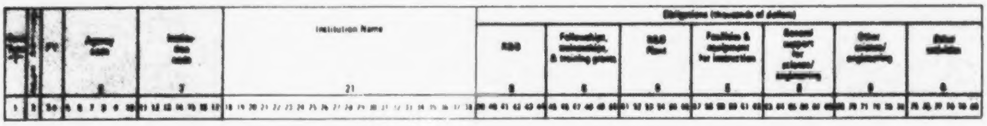
Valid Codes

Currently active codes are shown in the *Code Book* as indicated above. For institutions not included in the *Code Book*, contact NSF in accordance with procedures outlined in the *Introduction*.

Edit-Validation Criteria

Only institution codes listed in the *Code Book* or assigned by NSF will be accepted. As the Code Book is brought up to date annually by NSF, the latest issue must be used.

6. INSTITUTION NAME



Institution Name

21

Obligations (thousands of dollars)

Definition of Element

The name of the institution of higher education that received the award (corresponding to the Institution Code in columns 11-17, cards 1 and 2) is to be reported. This may be the parent institution or a branch, depending on the institution code on agency records. The name of the system office should be used *only* if the award is actually made to the system office itself and the system office code has been used.

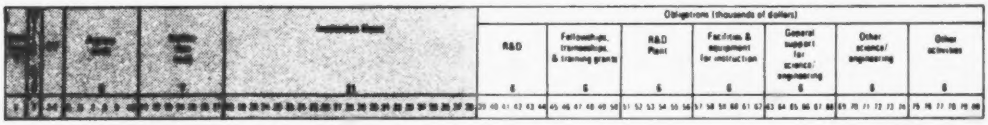
Valid Codes

Any combination of up to 21 alphabetic characters and spaces is acceptable. If the name of the institution is longer than 21 characters, the name should be abbreviated. Please check carefully to ensure that the name matches the institution code in columns 11-17.

Edit-Validation Criteria

No edit is performed on this data element, as it is used for reference only.

7. OBLIGATIONS AMOUNT, BY CATEGORY OF SUPPORT (in thousands of dollars)



Obligations (thousands of dollars)						
R&D 6	Fellowships, traineeships, & training grants 6	R&D Plant 6	Facilities & equipment for instruction 6	General support for science/engineering 6	Other science/engineering 6	Other activities 6
39 40 41 42 43 44	45 46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62	63 64 65 66 67 68	69 70 71 72 73 74	75 76 77 78 79 80

Method of Reporting

Obligations data should reflect actual obligations made during the fiscal year ending the previous September 30 regardless of when funds were authorized for or received by a department or agency and regardless of when such funds are to be spent by a recipient. In cases of interagency transfers of funds, the agency which actually obligates funds to an academic institution will report the obligation. EXCLUDE such items as loans; agency support of Federal employee training and development activities; and indirect support such as funds allocated to State agencies, even though the final destination of such funds is known to be an academic institution.

1. Obligations to each institution should be reported in terms of one or more of the following seven categories, the first six of which constitute the elements of academic science/engineering support. Definitions for the categories can be found on pages 11-13 of these instructions.

(a) *Research and development* (see also data element description for "Card type 2: Obligation amount, by field of science/engineering");

(b) *Fellowships, traineeships, and training grants* (see also data element description for "Card type 2: Obligation amount, by field of science/engineering");

(c) *R&D plant;*

(d) *Facilities and equipment for instruction in science and engineering;*

(e) *General support for science and engineering;*

(f) *Other activities related to science and engineering;*

(g) *All other activities* (i.e., those not directly related to science and engineering).

2. Obligations should be reported in *thousands* of dollars. For example, an obligations amount of $51,500 should be punched as 52 (right-justified). Obligations totaling less than $500 for any specific activity (e.g., R&D, general support for science and engineering) should be reported as zero (0 or blank or 000000).

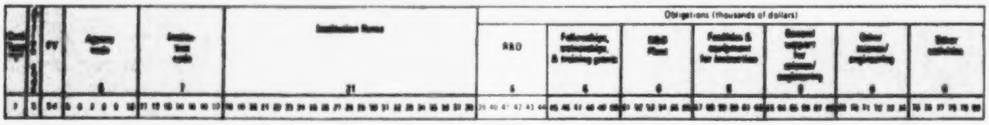
3. All obligations fields should be *right-justified*.

4. *Do not use overpunches in numeric fields*.

Edit-Validation Criteria

Columns 39-80 must be numeric or blank, with no overpunches.

7a. RESEARCH AND DEVELOPMENT



FY
Obligations (thousands of dollars)
R&D

Definition of Category

Research and development includes all direct, indirect, incidental, or related costs resulting from or necessary to performance of research and development by private individuals and organizations under grant, contract or cooperative agreement. Demonstration projects designed to test or prove whether a technology or method is, in fact, workable are considered to be within the scope of research and development if they are designed to produce new information, and are accomplished within a given time period. *Include* "research equipment" under research and development. "Research equipment" is any item (or interrelated collection of items comprising a system) of nonexpendable tangible property or software having a useful life of more than two years and an acquisition cost of $500 or more which is used wholly or in part for research.

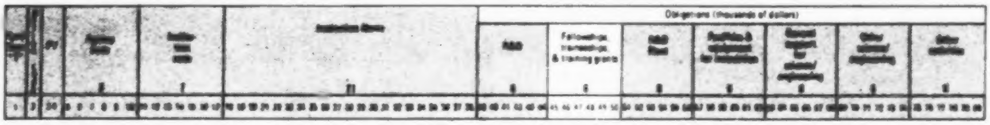
Research is systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Research is classified as either basic or applied according to the objectives of the sponsoring agency. It includes *basic research*, in which the objective of the sponsoring agency is to generate knowledge of the underlying foundations of phenomena and of observable facts without specific applications in mind; and *applied research*, in which the objective of the sponsoring agency is the creation of knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.

Development is systematic use of the knowledge and understanding gained from research directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.

The following activities are excluded from research and development, but should be reported under "other scientific activities":

- Routine product testing;
- Quality control;
- Topographical mapping and surveys;
- Collection of general-purpose statistics;
- Experimental production;
- Demonstrations designed to exhibit new technologies or methods or disseminate information thereon;
- Scientific and technical information activities.
- R&D facilities and fixed equipment.

7b. FELLOWSHIPS, TRAINEESHIPS, AND TRAINING GRANTS



FY
Obligations (thousands of dollars)
R&D
Fellowships, traineeships, & training grants

Definition of Category

Includes all fellowship, traineeship, and training grant programs which are directed primarily toward the development and maintenance of scientific and technical manpower.[1] EXCLUDED are projects which support research and educational institutes, seminars,and conferences such as teacher training activities provided through teacher institutes, short courses, research participation, and inservice seminars; activities aimed at the development of educational techniques and materials for use in science and engineering training; and programs which provide special opportunities for increasing the scientific knowledge and experience of precollege and undergraduate students. These activities are to be reported either under category 6 (Other activities related to science and engineering) or category 7 (All other activities) as appropriate.

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[1] The total amounts pertaining to such awards (stipends and cost-of-education allowances) will be reported in terms of the institution at which the recipient plans to do his research and/or study.

7c. R&D PLANT (R&D FACILITIES AND FIXED EQUIPMENT)

						Obligations (thousands of dollars)						
Card Type "1"	Action code	FY	Agency code 6	Institution code 7	Institution Name 21	R&D 6	Fellowships, traineeships, & training grants 6	R&D Plant 6	Facilities & equipment for instruction 6	General support for science/engineering 6	Other science/engineering 6	Other activities 6
1	2	3 4	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	39 40 41 42 43 44	45 46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62	63 64 65 66 67 68	69 70 71 72 73 74	75 76 77 78 79 80

Definition of Category

Includes all projects whose principal purpose is to provide support for construction, acquisition, renovation, modification, repair, or rental of facilities, land, works, or fixed equipment for use in scientific or engineering *research and development*. A facility is to be interpreted broadly to include any physical resource important to the conduct of research or development. All costs—direct, indirect, and related expenditures—are to be included.

If the R&D facilities are part of a larger facility devoted to other purposes as well, the funds should be distributed among the categories of support involved as appropriate. In general, other categories that would be involved are category 4 (Facilities and equipment for instruction in science and engineering) or category 7 (All other activities, i.e., those not specifically related to science and engineering). *Exclude* from the R&D plant category expendable research equipment and office furniture and equipment. See definition of "research equipment" under "research and development" category (page 11).

7d. FACILITIES AND EQUIPMENT FOR INSTRUCTION IN SCIENCE AND ENGINEERING

						Obligations (thousands of dollars)						
Card Type "1"	Action code	FY	Agency code 6	Institution code 7	Institution Name 21	R&D 6	Fellowships, traineeships, & training grants 6	R&D Plant 6	Facilities & equipment for instruction 6	General support for science/engineering 6	Other science/engineering 6	Other activities 6
1	2	3 4	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	39 40 41 42 43 44	45 46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62	63 64 65 66 67 68	69 70 71 72 73 74	75 76 77 78 79 80

Definition of Category

Includes all programs whose principal purpose is to provide support for construction, acquisition, renovation, modification, repair, or rental of facilities, land, works, or equipment for use in *instruction* in science or engineering.

If the instructional facilities are part of a larger facility devoted to other purposes as well, the funds should be distributed among the categories of support involved as appropriate. In general, other categories likely to be involved are category 3 (R&D plant) and category 7 (All other activities, i.e., those not specifically related to science and engineering).

7e. GENERAL SUPPORT FOR SCIENCE AND ENGINEERING

						Obligations (thousands of dollars)						
Card Type "1"	Action code	FY	Agency code 6	Institution code 7	Institution Name 21	R&D 6	Fellowships, traineeships, & training grants 6	R&D Plant 6	Facilities & equipment for instruction 6	General support for science engineering 6	Other science/engineering 6	Other activities 6
1	2	3 4	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	39 40 41 42 43 44	45 46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62	63 64 65 66 67 68	69 70 71 72 73 74	75 76 77 78 79 80

Definition of Category

Includes activities which provide support for nonspecific or generalized purposes related to scientific research and education. Such projects are generally oriented toward academic departments, institutes, or institutions as a whole. "General support" implies a spectrum of varying types of support. At one extreme is support provided without any specification of purpose other than that funds be used for scientific activities. Another kind of "general support" is to be found in projects that provide funds for activity within a specified field of science or engineering but without specification of explicit purpose. The distinguishing feature of "general support for science and engineering" projects is that they permit a significant measure of freedom as to purpose (research, faculty support, education, institutional support, etc.).

It is intended that among the projects to be reported under the category "general support for science and engineering" are projects awarded through the following agency programs:

NIH Biomedical Sciences Support Grants
NIH Health Sciences Advancement Awards
NIH General Research Support Grants
NSF College Science Improvement Program

Other programs consistent with the above guidelines may also be reported here.

7f. OTHER ACTIVITIES RELATED TO SCIENCE AND ENGINEERING

						Obligations (thousands of dollars)						
Card Type "1"	Action code	FY	Agency code	Institution code	Institution Name	R&D	Fellowships, traineeships, & training grants	R&D Plant	Facilities & equipment for instruction	General support for science/engineering	Other science/engineering	Other activities
			6	7	21	6	6	6	6	6	6	6
1	2	3 4	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	39 40 41 42 43 44	45 46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62	63 64 65 66 67 68	69 70 71 72 73 74	75 76 77 78 79 80

Definition of Category

Includes all academic science/engineering activities that cannot meaningfully be assigned to one of the five categories previously set forth. Among the types of activities to be included in this category are support for scientific conferences and symposia, teacher institutes, and activities aimed at increasing the scientific knowledge of precollege and undergraduate students.

7g. ALL OTHER ACTIVITIES, I.E., THOSE NOT SPECIFICALLY RELATED TO SCIENCE AND ENGINEERING

						Obligations (thousands of dollars)						
Card Type "1"	Action code	FY	Agency code	Institution code	Institution Name	R&D	Fellowships, traineeships, & training grants	R&D Plant	Facilities & equipment for instruction	General support for science/engineering	Other science/engineering	Other activities
			6	7	21	6	6	6	6 -	6	6	6
1	2	3 4	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	39 40 41 42 43 44	45 46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62	63 64 65 66 67 68	69 70 71 72 73 74	75 76 77 78 79 80

Definition of Category

Includes all other obligations which are not included in the six science/engineering categories defined on pages 11 to 13 of these instructions, but which represent direct funding (excluding repayable loans) from a Federal agency to an academic institution for activities or purposes not specifically related to science and engineering. All funding specifically supporting activities in the arts and humanities should be included here, as well as projects within which a scientific or engineering portion is not identifiable.

B. CARD TYPE 2

8. OBLIGATION AMOUNT, BY FIELD OF SCIENCE/ENGINEERING (REPORTED ONLY FOR R&D AND FELLOWSHIP, TRAINEESHIP, AND TRAINING GRANT OBLIGATIONS)

Card Type "2"	Action code	FY	Agency code 6	Institution code 7	Field of Science/Engineering			Field of Science/Engineering			Field of Science/Engineering			Field of Science/Engineering			Blank 7
					FS code	Obligations R&D 6	Obligations Fellowships & traineeships 6	FS code	Obligations R&D 6	Obligations Fellowships & traineeships 6	FS code	Obligations R&D 6	Obligations Fellowships & traineeships 6	FS code	Obligations R&D 6	Obligations Fellowships & traineeships 6	
1	2	3 4	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19	20 21 22 23 24 25	26 27 28 29 30 31	32 33	34 35 36 37 38 39	40 41 42 43 44 45	46 47	48 49 50 51 52 53	54 55 56 57 58 59	60 61	62 63 64 65 66 67	68 69 70 71 72 73	74 75 76 77 78 79 80

Method of Reporting

For two categories *(R&D and fellowships, traineeships, and training grants)*, the obligations reported on card 1 must be broken down by applicable field of science/engineering and reported on one or more type-2 cards (see codes and definitions of fields of science/engineering attached). Do not submit type-2 cards for any other category of obligations.

1. Each field of science/engineering entry consists of 14 columns. The first two columns are reserved for the applicable field of science/engineering code; the next six for total R&D obligations in that field; and the last six for total fellowship, traineeship, and training grant obligations in that field.

2. Enter only fields of science/engineering applicable to the obligations at the institution involved.

3. If your agency's internal field of science/engineering codes differ from those on pp. 15 and 16, please check to see that they have been converted before submitting your response.

4. Be sure that *amounts* as well as field codes appear on all type-2 cards (even if all funding to a particular institution is in a single field).

5. A maximum of 4 field of science/engineering entries can be recorded on each type-2 card. If, for example, five field of science/engineering entries are to be reported, a second type-2 card must be used for the fifth entry.

6. If the last type-2 card submitted for an institution does not contain four field of science/engineering entries, leave *blank* all columns after those pertaining to the last field of science/engineering entry used.

7. Obligations should be reported in *thousands* of dollars, and right-justified.

8. The sum of the R&D obligations reported on one or more type-2 cards must equal the R&D total reported on card 1. Similarly, the sum of the fellowship, traineeship, and training grant obligations on one or more type-2 cards must equal the total for that category reported on card 1.

9. In cases where total R&D or total fellowships, traineeships, and training grant obligations exceed $500, but where each field of science/engineering is less than $500, report the entire amount for the activity under the field of science/engineering receiving the largest amount.

10. Note that fields 52 and 53 are no longer valid fields of science/engineering. Please use only the revised life science breaks introduced in 1978.

Edit-Validation Criteria

1. Columns 2-17 must match those on card 1.

2. Only field of science/engineering codes shown below are accepted.[1] Any field with a zero or blank field of science/engineering code will be ignored.

3. Obligation amounts must be right-justified.

4. The sum of all fields of science/engineering for a category (for example, R&D) reported on card(s) 2 must equal the total reported for that category on card 1.

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[1] The use of these codes is authorized by OMB Circular No. A-46, May 13, 1970.

Field of Science/Engineering Codes and Definitions

CODE

Physical sciences are concerned with the understanding of the material universe and its phenomena. They comprise the fields of astronomy, chemistry, physics, and physical sciences not elsewhere classified. Examples of disciplines under each of these fields are

11 **Astronomy:** laboratory astrophysics; optical astronomy; radio astronomy; theoretical astrophysics; X-ray, Gamma-ray, neutrino astronomy.
12 **Chemistry:** inorganic; organo-metallic; organic; physical.
13 **Physics:** acoustics; atomic and molecular; condensed matter; elementary particles; nuclear structure; optics; plasma.
19 **Physical sciences, n.e.c.***

Mathematical and computer sciences employ logical reasoning with the aid of symbols and are concerned with the development of methods of operations employing such symbols. They comprise the following two subcategories:

21 **Mathematics:** algebra; analysis; applied mathematics; foundations and logic; geometry; numerical analysis; statistics; topology.
22 **Computer sciences:** programming languages; computer and information sciences (general); design, development, and application of computer capabilities to data storage and manipulation; information sciences and systems; systems analysis.
29 Mathematical and computer sciences, n.e.c.*

Environmental sciences: (terrestrial and extraterrestrial) are concerned with the gross nonbiological properties of the areas of the solar system that directly or indirectly affect man's survival and welfare; they comprise the fields of atmospheric sciences, geological sciences, oceanography, and environmental sciences not elsewhere classified. Note that all obligations in support of oceanography, whether physical or biological, are now to be reported under field 33. Examples of disciplines under each of these fields are

31 **Atmospheric sciences:** aeronomy; solar; weather modification; extraterrestrial atmospheres; meteorology.
32 **Geological sciences:** engineering geophysics; general geology; geodesy and gravity; geomagnetism; hydrology; inorganic geochemistry; isotopic geochemistry; organic geochemistry; laboratory geophysics; paleomagnetism; paleontology; physical geography and cartography; seismology; soil sciences.
33 **Oceanography:** biological oceanography; chemical oceanography; geological oceanography; physical oceanography; marine geophysics.
39 **Environmental sciences, n.e.c.***

Engineering is concerned with studies directed toward developing engineering principles or toward making specific scientific principles usable in engineering practice. Engineering is divided into eight fields: aeronautical, astronautical, chemical, civil, electrical, mechanical, metallurgy and materials, and engineering not elsewhere classified. Examples of disciplines under each of these fields are

41 **Aeronautical:** aerodynamics.
42 **Astronautical:** aerospace; space technology.
43 **Chemical:** petroleum; petroleum refining; process.
44 **Civil:** architectural; hydraulic; hydrologic; marine; sanitary and environmental; structural; transportation.
45 **Electrical:** communication; electronic; power.
46 **Mechanical:** engineering mechanics.
47 **Metallurgy and materials:** ceramic; mining; textile; welding.
49 **Engineering, n.e.c.*:** agricultural; bioengineering; biomedical; industrial and management; nuclear; ocean engineering; systems.

Life sciences consist of five detailed fields: biological (excluding environmental), environmental biology, agricultural, medical, and life sciences not elsewhere classified. The illustrative disciplines provided below under each of these detailed fields are intended to be guidelines, not sharp definitions, as to what should be reported under a particular field; they represent examples of disciplines generally classified under each detailed field. A discipline, however, may be classified under another detailed field when the major emphasis is elsewhere. Research in biochemistry could be reported as biological, agricultural, or medical, depending on the orientation of the project; human biochemistry should be classified under biological, but animal biochemistry or plant biochemistry should be under agricultural.

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*Not elsewhere classified. To be used for multidisciplinary projects within the primary field and for single discipline projects for which a separate discipline code has not been assigned.

51 **Biological sciences (excluding environmental biology):** anatomy; biochemistry; biology; biometry and biostatistics; biophysics; botany; cell biology; entomology and parasitology; genetics; microbiology; neuroscience (biological); nutrition; physiology; zoology; other biological, n.e.c.*
54 **Environmental biology:** ecosystem sciences; evolutionary biology; limnology; physiological ecology; population biology; population and biotic community ecology; systematics; other environmental biology, n.e.c.*
55 **Agricultural sciences:** agronomy; animal sciences; food science and technology; fish and wildlife; forestry; horticulture; plant sciences; soils and soil science; phytopathology; phytoproduction; agriculture, general; other agriculture, n.e.c.*
56 **Medical sciences:** internal medicine, neurology, obstetrics and gynecology; ophthalmology, otolaryngology; pediatrics; preventive medicine; pathology; pharmacology; psychiatry; radiology; surgery; dentistry; pharmacy; veterinary medicine; other medical, n.e.c.*
59 **Life sciences, n.e.c.***

Psychology deals with behavior, mental processes, and individual and group characteristics and abilities. Psychology is divided into three categories: biological aspects, social aspects, and psychological sciences, not elsewhere classified. Examples of the disciplines under each of these fields are

61 **Biological aspects:** experimental psychology; animal behavior; clinical psychology; comparative psychology; ethology.
62 **Social aspects:** social psychology; educational, personnel, vocational psychology and testing; industrial and engineering psychology; development and personality.
69 **Psychological sciences, n.e.c.***

Social sciences are directed toward an understanding of the behavior of social institutions and groups and of individuals as members of a group. Social sciences include anthropology, economics, history, linguistics, political science, sociology, and social sciences not elsewhere classified. Examples of disciplines under the fields of social science are

71 **Anthropology:** archaeology; cultural and personality; social and ethnology; applied anthropology.
72 **Economics:** econometrics and economic statistics; history of economic thought; international economics; industrial, labor and agricultural economics; macroeconomics; microeconomics; public finance and fiscal policy; theory; economic systems and development.
73 **History:** history and philosophy of science.
74 **Linguistics:** anthropological-archeological; computational; psycholinguistics; sociolinguistics.
75 **Political science:** area or regional studies; comparative government; history of political ideas; international relations and law; national political and legal systems; political theory; public administration.
76 **Sociology:** comparative and historical; complex organizations; culture and social structure; demography; group interactions; social problems and social welfare; sociological theory.
79 **Social sciences, n.e.c.*:** research in law and education not elsewhere classified; socioeconomic geography.
99 **Other sciences, n.e.c.*:** to be used for multidisciplinary and interdisciplinary projects that cannot be classified within one of the above broad fields of science/engineering.

PART II

INSTRUCTIONS FOR FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC's) ADMINISTERED BY ACADEMIC INSTITUTIONS

Reporting Guidelines

Data on funds obligated for academic science/engineering are to be reported for each university-administered federally funded research and development center (FFRDC) receiving agency support. Funds obligated to each of the centers should be reported by all Federal agencies, regardless of the major sponsoring agency. For example, several agencies, including NASA, Air Force, and others have financed activities at the National Center for Atmospheric Research even though the National Science Foundation is the major sponsoring agency.

Obligations are to be classified according to the six academic science/engineering categories defined in the instructions for academic institutions (part I):

1. Research and development
2. Fellowships, traineeships, and training grants
3. R&D plant
4. Facilities and equipment for instruction in science and engineering
5. General support for science and engineering
6. Other activities related to science and engineering

Field of science/engineering data and funding for activities not specifically related to science and engineering (non-science/engineering funds) are *not* to be reported for FFRDC's. **Do not submit type-2 cards for FFRDC's.**

The format for reporting data on FFRDC's managed by academic institutions is shown on page 18. Note that this format differs from the card-1 format used to report data on academic institutions only in that card type should be coded "3" in column 1. Note that columns 75-80 are to be left blank.

The instructions for reporting data on academically associated FFRDC's are similar to those used for card-1 reporting on academic institutions. The definitions of support categories, the agency codes, and most other instructions provided in part I, pages 1-13, are equally applicable to FFRDC reporting.

Agencies are requested to submit FFRDC data on magnetic tape or punched cards in accordance with the submission specifications outlined on page vi. The cards (or tape) should be accompanied by a printout sorted by institution code. Agency and agency component totals for each of the six categories of support are to be shown on the printout. **The submission should be reviewed and verified by each agency for conformity to data collection standards and consistency with prior submissions.**

A listing of university-managed centers (with their respective codes) is shown on page 18. This list resulted from the findings of an interagency task force formed to study this area and has been amended over time to reflect institutional changes. The Director, Division of Science Resources Studies, NSF, should be advised of any changes in the status of the centers.

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Card Type 3: Format for FFRDC's Administered by Academic Institutions

Card Type "3"	Action code	FY	Agency code	Institution code	Institution Name	Obligations (thousands of dollars)						
						R&D	Fellowships, traineeships, & training grants	R&D Plant	Facilities & equipment for instruction	General support for science/ engineering	Other science/ engineering	**Other activities Leave Blank**
			6	7	21	6	6	6	6	6	6	**6**
1	2	3 4	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	39 40 41 42 43 44	45 46 47 48 49 50	51 52 53 54 55 56	57 58 59 60 61 62	63 64 65 66 67 68	69 70 71 72 73 74	**75 76 77 78 79 80**

NOTE: Centered figures denote number of columns per field.

Names and Codes of FFRDC's Administered by Academic Institutions

Department of Defense

Department of the Air Force

CODE	
90 0010 0	Lincoln Laboratory (Massachusetts Institute of Technology) Lexington, Massachusetts
90 0067 0	Software Engineering Institute (Carnegie Mellon University) Pittsburgh, Pennsylvania

Department of Energy

CODE	
90 0011 8	Ames Laboratory (Iowa State University of Science and Technology) Ames, Iowa
90 0012 6	Argonne National Laboratory (University of Chicago and Argonne Universities Association) - Argonne, Illinois
90 0013 4	Brookhaven National Laboratory (Associated Universities, Inc.) Upton, Long Island, N.Y.
90 0016 7	E.O. Lawrence Berkeley Laboratory (University of California) Berkeley, California
40 1435 3	E.O. Lawrence Livermore Laboratory (University of California) Livermore, California
90 0064 7	Fermi National Accelerator Laboratory (Universities Research Association, Inc.) Batavia, Illinois
90 0018 3	Los Alamos Scientific Laboratory (University of California) Los Alamos, New Mexico
90 0019 1	Oak Ridge Associated Universities (Oak Ridge Associated Universities) Oak Ridge, Tennesssee
90 0020 9	Plasma Physics Laboratory (Princeton University) Princeton, New Jersey
90 0017 5	Stanford Linear Accelerator Center (Stanford University) Stanford, California

National Aeronautics and Space Administration

CODE	
90 0024 1	Jet Propulsion Laboratory (California Institute of Technology) Pasadena, California

National Science Foundation

CODE	
90 0026 6	National Optical Astronomy Observatory (Association of Universities for Research in Astronomy, Inc.) Tucson, Arizona
40 1119 3	National Astronomy and Ionosphere Center (Cornell University) Arecibo, Puerto Rico
90 0027 4	National Center for Atmospheric Research (University Corp. for Atmospheric Research) Boulder, Colorado
90 0028 2	National Radio Astronomy Observatory (Associated Universities, Inc.) Green Bank, West Virginia

Note: The Space Radiation Effects Laboratory (90 0029 0) was closed in August 1978. Any further funding for this installation should be reported under the College of William and Mary (00 8055 6).

PART III

INSTRUCTIONS FOR NONPROFIT INSTITUTIONS (INCLUDING FFRDC's ADMINISTERED BY NONPROFIT INSTITUTIONS)

Reporting Guidelines

Federal agencies presently reporting obligations for academic institutions are requested to provide data for nonprofit institutions and associated FFRDC's in accordance with the guidelines outlined below.

Nonprofit institutions are defined as those legal entities other than universities and colleges which are privately organized or chartered to serve the public interest and are exempt from most forms of Federal taxation. They include independent research institutes; federally funded research and development centers (FFRDC's) administered by nonprofit organizations; voluntary nonprofit hospitals; professional and technical societies and academies of science; private foundations; science exhibitors; trade associations and agricultural cooperatives; and other nonprofit organizations, not elsewhere classified. This sector excludes all agencies of Federal, State, or local governments, including special government districts; university-managed or -affiliated hospitals; and all institutes, bureaus, or offices associated with or controlled by either educational institutions or profit corporations. Note that all funding to organizations controlled by or affiliated with institutions of higher education (except university-administered FFRDC's) should be included in the amounts obligated to their parent institutions and reported on type-1 and type-2 cards.

For this survey, Federal agencies are requested to report ALL R&D and R&D plant obligations to each nonprofit organization listed in the current Code Book, regardless of amount. This list has been expanded in the current edition.

In addition to those listed in the Code Book, any nonprofit institution receiving obligations for research, development, and R&D plant should be reported. Data for nonprofit institutions to be added to the survey population should be submitted on a separate typed sheet or computer-generated listing with addresses of the institutions and a short note on the type of institution (e.g., research institute, hospital, private foundation, etc.).

Obligations are to be reported for *only* two categories of support—research and development and R&D plant. Definitions that were provided in Part I of these instructions (pages 11 and 12) for research and development and R&D plant apply to data submitted for nonprofit institutions.

As in Parts I and II, data should reflect actual obligations (excluding loans) made during the latest fiscal year regardless of when funds were to be spent by a recipient. Obligations will be reported in terms of thousands of dollars, rounded to the nearest thousand dollars. A blank field will be interpreted as a zero amount.

The format for reporting data on nonprofit institutions and associated FFRDC's is shown on page 21. Note that the survey system utilizes a standardized card format and that nonprofit institution data should be submitted in a format analogous to card 1 for the university and college portion of the survey, with the following modifications:

1. Card type code in column 1 should be "4" for nonprofit institutions and "5" for FFRDC's administered by nonprofit institutions.
2. Columns 45-50 and 57-80 should be left blank.

Each agency should submit one 80-column punched card (or card image on tape) for each nonprofit institution and one 80-column punched card (or card image on tape) for each FFRDC managed by a nonprofit institution to which R&D or R&D plant funds were obligated during the fiscal year being reported. Magnetic tape and punched card standards for the submission are detailed on page vi. *Do not submit type-2 cards for nonprofit institutions.*

In addition to the punched cards or magnetic tape, each reporting agency should provide a printout with dollar totals for all of the nonprofit institutions receiving support and, if appropriate, a similar printout with dollar totals for all nonprofit FFRDC's. The printout should be sorted by institution identification code. Institutions lacking codes should be listed geographically (State/institution sequence). **It is understood that the submission will be reviewed and verified by each agency for conformity to data collection standards and consistency with data submissions for previous years.**

An updated list of independent nonprofit institutions and FFRDC's included in the survey with their respective codes is provided in the latest revision to the *Code Book*. Agency codes to be used on nonprofit data records are shown in part I of these instructions, pages 7 and 8.

Card Format for Nonprofit Institutions and Nonprofit-Administered FFRDC's
(Card types 4 and 5)

						Obligations (thousands of dollars)			
Card Type "4" or "5"	Action code	FY	Agency code	Institution code	Institution Name	R&D	[illegible]	R&D Plant	[illegible]
			6	7	21	6	[illegible]	6	24
1	2	3 4	5 6 7 8 9 10	11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38	39 40 41 42 43 44	[illegible]	51 52 53 54 55 56	57 [illegible] 61 62 [illegible] 71 72 73 74 75 76 77 78 79 80

NOTE: Centered figures denote number of columns per field.

Federally Funded Research and Development Centers Administered by Nonprofit Institutions

Institution code	Name of Institution	Abbreviation
	Department of Defense	
	Office of the Secretary of Defense	
90 0041 5	Institute for Defense Analyses (Va.)	IDA
90 0068 8	Logistics Management Institute (Md.)	LMI
90 0069 6	Office of the Secretary of Defense/ Organization of the Joint Chiefs of Staff	OSD/OJCS
	Department of the Army	
90 0070 4	Arroyo Center (Calif.)	Arroyo Ctr
	Department of the Navy	
90 0038 1	Center for Naval Analyses (Va.)	CNA
	Department of the Air Force	
90 0042 3	Aerospace Corporation (Calif.)	Aerospace Corp
90 0045 6	MITRE Corporation C3 Division (Va.)*	MITRE C3Div.
90 0065 4	Project Air Force (RAND)	Project Air Force
	Department of Energy	
40 0885 0	Battelle Memorial Institute, Pacific Northwest Laboratory (Wash.)	Battelle Mem. Inst. Pac NW Lab.
90 0066 2	Solar Energy Research Institute (Calif.)	SERI

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*MITRE Corporation was formerly listed in its entirety as a nonprofit-administered FFRDC. MITRE Corporation itself is now listed as a nonprofit research institute with the code 40 1102 9, and its FFRDC component, the C3 Division, is listed separately, retaining the code 90 0045 6.

scientific and engineering expenditures at universities and colleges

purpose and background

This survey is intended to collect information on three areas of academic spending for scientific and engineering (S/E) activities: Current fund separately budgeted research and development (R&D) expenditures by source of funds and S/E field, current fund research equipment expenditures, and capital expenditures for S/E activities.

The survey originated in 1954 and has been conducted annually since 1972. The population surveyed in most years has consisted of the 500 to 600 universities and colleges which grant a graduate S/E degree and/or annually perform at least $50,000 in separately budgeted research and development; these institutions account for over 95 percent of the Nation's academic R&D expenditures. In addition, all 17 university-administered federally funded research and development centers (FFRDC's) are surveyed.

survey instrument

One section of the questionnaire requests information on total current fund expenditures for separately budgeted S/E research and development by source of funds and the percentage of the total as well as the federally financed portion that is considered basic research. Information is also requested on the total and federally financed current fund expenditures for separately budgeted R&D activities by detailed S/E fields. Data in engineering and environmental sciences subdisciplines, which were requested on an optional basis in 1980, have become a standard part of the survey form since 1981.

Institutions are asked to report that portion of total and federally financed current fund expenditures reported on the above items that went for the purchase of research equipment. Included are all research equipment purchased under sponsored research project awards from current fund accounts for separately budgeted research and development.

Finally, institutional respondents are asked to provide data on capital expenditures for facilities and equipment (as defined in Section J.13 of OMB Circular A-21, revised) for research, development, and instruction by broad S/E field, showing amounts from both Federal and other funding sources.

sample design

Since fiscal year (FY) 1984, the survey has been based on a sample, as opposed to a full-population survey. The sample of approximately 400 academic institutions includes with certainty both S/E doctorate-granting institutions and historically black universities and colleges with R&D expenditures, as well as a probability sample of the remaining institutions. Also included, with certainty, are 17 FFRDC's administered by universities and colleges.

data availability

In FY 1978, NSF experimented with biennial reductions in the survey population and data items to reduce respondent burden.

Two significant changes in survey procedures were attempted in FY 1978 that make data for this year atypical and present a discontinuity in the generation of time-series data from this survey:

First, unlike the surveys for FY's 1972-77 and 1979-85 surveys, the survey population for FY 1978 was restricted to doctorate-granting institutions and FFRDC's.

Second, the FY 1978 survey collected information on a "short-form" which covered a limited number of items. While all surveys have collected data on separately budgeted R&D expenditures by source of funds (total and Federal) and by detailed S/E field, the FY 1978 form omitted questions on character of work (e.g., basic research) and on capital expenditures for S/E activities. Expenditures for instruction and departmental research were collected annually during the period 1972-77 but were discontinued in 1978 and are not available on the current multiyear archival tapes.

data access

Summary statistical tables from this survey are available on diskettes prepared for use on an IBM-compatible microprocessor. Inquiries regarding this survey should be addressed to:

Ms. Judith Coakley/
Mrs. Marge Machen
Division of Science Resources Studies
Universities and Colleges Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L602
Washington, D.C. 20550
(202) 634-4673

Current survey data are provided on multiyear magnetic tapes containing information for earlier years; the most current tape contains data for FY's 1978-86. The tape only includes data items from earlier years which correspond to the latest survey form; information collected in prior years having no counterpart in the current survey is omitted.

Omitted data items are available from previous multiyear data tapes for FY's 1972-79, 1973-80, 1975-82, and 1976-83. The user is cautioned that no attempt has been made to update these earlier tapes with corrections which may have subsequently been received from surveyed institutions. Data for FY's 1972-77 are available either on individual single-year tapes or as separate data files on a single tape. For further information regarding data tape availability or contents, please contact:

Mr. George Nozicka
Quantum Research Corporation
7300 Pearl Street, Suite 210
Bethesda, Maryland 20814
(301) 657-3070

The cost of the multiyear tape is $325 and a single year tape is $100. A *Data User Guide* has been developed for the 1972-86 period that documents the compatible code structure utilized in the four NSF academic surveys. A copy is available from the Universities and Colleges Studies Group/Division of Science Resources Studies.

NSF Form 411 (10-85)

FORM APPROVED
OMB No. 3145-0015
Expiration Date: 1/31/87

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF SCIENTIFIC AND ENGINEERING EXPENDITURES AT UNIVERSITIES AND COLLEGES, FY 1985

Organizations are requested to complete and return this form to:

NATIONAL SCIENCE FOUNDATION
1800 G Street, N.W., Room L-602
Washington, D.C. 20550
Attn: UNISG/R&D

This form should be returned by January 10, 1986. Your cooperation in returning the survey questionnaire promptly is very important.

This information is solicited under the authority of the National Science Foundation Act of 1950, as amended. All information you provide will be used for statistical purposes only. Your response is entirely voluntary and your failure to provide some or all of the information will in no way adversely affect your institution.

All financial data requested on this form should be reported in thousands of dollars; for example, an expenditure of $25,342 should be rounded to the nearest thousand dollars and reported as $25.

Where exact data are not available, estimates are acceptable. Your estimates will be better than ours.

Include data for branches and all organizational units of your institution, such as medical schools and agricultural experiment stations. Also include hospitals or clinics owned, operated, or controlled by universities, and integrated operationally with the clinical progams of your medical schools. **Exclude** data for federally funded research and development centers (FFRDC's). A separate questionnaire is included in this package if your institution administers an FFRDC. **If you have any questions please contact Judith Coakley or Marge Machen (202-634-4674).**

Please correct if name or address has changed

Financial data are requested for your institution's 1985 fiscal year.

Please circle the month in which your institution's fiscal year begins:

1 JAN	2	3	4	5	6	7	8	9	10	11	12 DEC

How many person hours were required to complete this form? ________

Date Submitted ____________________

Scope:

This survey collects data on expenditures by universities and colleges for separately budgeted research and development (R&D) in science and engineering. Definitions used are compatible with OMB Circular A-21, revised July 23, 1982. Items 1 and 2 ask for *current fund expenditures* by source of funds and by field of science/engineering. Item 3 collects data on that *portion* of *current fund expenditures* reported in items 1 and 2 that went for the purchase of scientific and engineering research equipment. Item 4 collects data on capital expenditures for facilities and equipment for research, development, and instruction by source of funds and field of science/engineering.

Definitions:

1. ***Research and Development*** (**R&D**). R&D for purposes of this survey is the same as "organized research" as defined in Section B.1.b. of OMB Circular A-21 (revised). It includes all R&D activities of an institution that are *separately budgeted and accounted for*. R&D includes both "sponsored research" activities (sponsored by Federal and non-Federal agencies and organizations) and "university research" (separately budgeted under an internal application of institutional funds).
    a. *Research* is a systematic study directed toward fuller knowledge or understanding of the subject studied. Research is classified as either basic or applied, according to the objectives of the investigator.
    b. *Development* is systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.
2. ***Current fund expenditures.*** Expenditures of funds available for current operations. Such expenditures include all unrestricted gifts and restricted current funds to the extent that such funds were expended for current operating purposes.
3. ***Capital expenditures*** (for facilities and equipment). A capital expenditure as defined in Section J.13 of OMB Circular A-21 (revised) means the cost of the asset including the cost to put it in place. "Equipment" as a capital expenditure means an article of nonexpendable tangible personal property having a useful life of more than two years and an acquisition cost of $500 or more per unit; lower limits may be established, consistent with institutional policy.

PLEASE TYPE OR PRINT NAME OF PERSON SUBMITTING THIS FORM	TITLE	AREA CODE	EXCH.	NO.	EXT.
NAME OF PERSON WHO PREPARED THIS SUBMISSION (if different from above)	TITLE	AREA CODE	EXCH.	NO.	EXT.

Instructions for Items 1 and 2

Separately budgeted research and development (R&D) includes all funds expended for activities specifically organized to produce research outcomes and commissioned by an agency either external to the institution or separately budgeted by an organizational unit within the institution. *Include* research equipment purchased under research project awards from "current fund" accounts. Also, *include* research funds subcontracted to outside organizations. *Exclude* training grants, public service grants, demonstration projects, and departmental research expenditures that are not separately budgeted. Also, *exclude* any R&D expenditures in the fields of education, law, humanities, music, the arts, physical education, library science, and all other nonscience fields.

a. *Federal Government.* Report grants and contracts for R&D (including direct and reimbursed indirect costs) by all agencies of the Federal Government.

b. *State and local governments.* Include funds for R&D from State, county, municipal, or other local governments and their agencies. Include here State funds which support R&D at agricultural and other experiment stations.

c. *Industry.* Include all grants and contracts for R&D from profitmaking organizations, whether engaged in production, distribution, research, service, or other activities. Do not include grants and contracts from nonprofit foundations financed by industry; these should be reported under *All other sources* (line 1175).

d. *Institutional funds.* Report funds, including indirect costs, which your institution spent for R&D activities from the following sources: (1) General-purpose State or local government appropriations; (2) general-purpose grants from industry, foundations, or other outside sources; (3) tuition and fees; (4) endowment income. In addition, estimate your institution's contribution to unreimbursed indirect costs incurred in association with R&D projects financed by outside organizations, and mandatory cost sharing on Federal and other grants. To estimate unreimbursed indirect costs, many institutions use a university-wide negotiated indirect cost rate multiplied by the base (e.g., direct salaries and wages, etc.) minus actual indirect cost recoveries. If your institution now separately budgets what was previously classified as departmental research, these data should be included in line 1161.

e. *All other sources.* Include grants for R&D from nonprofit foundations and voluntary health agencies as well as from all other sources not elsewhere classified. Funds from foundations which are affiliated with, or granted solely to your institution, should be included under line 1160, Institutional funds. Funds for R&D received from a health agency that is a unit of a State or local government should be reported under State and local governments (line 1125). Also include gifts from individuals that are restricted by the donor to research.

ITEM 1. CURRENT FUND EXPENDITURES FOR SEPARATELY BUDGETED RESEARCH AND DEVELOPMENT IN THE SCIENCES AND ENGINEERING, BY SOURCE OF FUNDS, FY 1985 (Include indirect costs)

Source of funds		(1) Total (Dollars in thousands)	(2) Basic research (Percent of column 1)
a. Federal Government	1110	$	____________ %
*b. State and local governments	1125		**Basic research** is directed toward an increase of knowledge; it is research where the primary aim of the **investigator** is a fuller knowledge or understanding of the subject under study rather than a specific application thereof.
c. Industry	1150		
d. Institutional funds	1160		
(1) Separately budgeted	1161		
(2) Underrecovery of indirect costs and cost sharing	1162		
*e. All other sources	1175		
f. TOTAL (sum of a through e)	1100	$	____________ %

*Combined data cell (See instructions for b and e).

CONFIDENTIALITY

Information received from individual institutions in lines 1161 and 1162, or estimates for basic research expenditures, will **not** be published or released; only aggregate totals will appear in publications.

Total R&D expenditures reported in line 1100, column (1) and line 1400, column (1) should be the same.

Federally financed R&D expenditures reported in line 1110, column (1) and line 1400, column (2) should be the same.

ITEM 2. CURRENT FUND EXPENDITURES (TOTAL AND FEDERALLY FINANCED) FOR SEPARATELY BUDGETED RESEARCH AND DEVELOPMENT, BY FIELD OF SCIENCE/ENGINEERING: FY 1985

(Include indirect costs)*

Field of science/engineering		(Dollars in thousands)	
		(1) Total	(2) Federal
a. ENGINEERING (TOTAL)	1410		
(1) Aeronautical & astronautical	1411		
(2) Chemical	1412		
(3) Civil	1413		
(4) Electrical	1414		
(5) Mechanical	1415		
(6) Other	1416		
b. PHYSICAL SCIENCES (TOTAL)	1420		
(1) Astronomy	1421		
(2) Chemistry	1422		
(3) Physics	1423		
(4) Other	1424		
c. ENVIRONMENTAL SCIENCES (TOTAL)	1430		
(1) Atmospheric	1431		
(2) Earth sciences	1432		
(3) Oceanography	1433		
(4) Other	1434		
d. MATHEMATICAL SCIENCES (TOTAL)	1441		
e. COMPUTER SCIENCES (TOTAL)	1442		
f. LIFE SCIENCES (TOTAL)	1450		
(1) Agricultural	1451		
(2) Biological	1452		
(3) Medical	1453		
(4) Other	1454		
g. PSYCHOLOGY (TOTAL)	1460		
h. SOCIAL SCIENCES (TOTAL)	1470		
(1) Economics	1471		
(2) Political science	1472		
(3) Sociology	1473		
(4) Other	1474		
i. OTHER SCIENCES, not elsewhere classified (TOTAL)	1480		
j. TOTAL (sum of a through i)	1400		

*PLEASE EXCLUDE from your response any R&D expenditures in the fields of education, law, humanities, music, the arts, physical education, library science, and all other nonscience fields.

ITEM 3. CURRENT FUND EXPENDITURES FOR RESEARCH EQUIPMENT (TOTAL AND FEDERALLY FINANCED) FOR SEPARATELY BUDGETED RESEARCH AND DEVELOPMENT, BY FIELD OF SCIENCE/ENGINEERING: FY 1985*

(See page 5 for instructions.)

Field of science/engineering		(Dollars in thousands)	
		(1) Total	(2) Federal
a. ENGINEERING (TOTAL)	1810		
(1) Aeronautical & astronautical	1811		
(2) Chemical	1812		
(3) Civil	1813		
(4) Electrical	1814		
(5) Mechanical	1815		
(6) Other	1816		
b. PHYSICAL SCIENCES (TOTAL)	1820		
(1) Astronomy	1821		
(2) Chemistry	1822		
(3) Physics	1823		
(4) Other	1824		
c. ENVIRONMENTAL SCIENCES (TOTAL)	1830		
(1) Atmospheric	1831		
(2) Earth sciences	1832		
(3) Oceanography	1833		
(4) Other	1834		
d. MATHEMATICAL SCIENCES (TOTAL)	1841		
e. COMPUTER SCIENCES (TOTAL)	1842		
f. LIFE SCIENCES (TOTAL)	1850		
(1) Agricultural	1851		
(2) Biological	1852		
(3) Medical	1853		
(4) Other	1854		
g. PSYCHOLOGY (TOTAL)	1860		
h. SOCIAL SCIENCES (TOTAL)	1870		
(1) Economics	1871		
(2) Political science	1872		
(3) Sociology	1873		
(4) Other	1874		
i. OTHER SCIENCES, not elsewhere classified (TOTAL)	1880		
j. TOTAL (sum of a through i)	1800		

*Current fund expenditures in each field for scientific research equipment should be a subset of the "Total" and "Federal" column reported in item 2.

Item 3 Instructions

Please report that **portion** of current fund expenditures reported in items 1 and 2 that went for the purchase of research equipment. This includes all research equipment purchased under sponsored research project awards from current fund accounts.

NOTE: These research equipment expenditures are **not** to be included under capital expenditures reported in item 4.

For column (1) report current fund expenditures for R&D from all sources: Federal Government, State, county, municipal, or other governments and their agencies (including State funds supporting R&D at agricultural experiment stations); industry; institutional funds; and private foundations and voluntary health agencies, individuals, and associations.

For column (2) include funds from grants and contracts for R&D sponsored by agencies of the Federal Government.

Item 4 Instructions

Please report expenditures for facilities that were in process or completed during FY 1985.

Capital expenditures for facilities and equipment **include** the following: (a) Fixed equipment such as built-in equipment and furnishings; (b) movable scientific equipment such as oscilloscopes and pulse-height analyzers; (c) movable furnishings such as desks; (d) architect's fees, site work, extension of utilities, and the building costs of service functions such as integral cafeterias and bookstores of a facility; (e) facilities constructed to house separate components such as medical schools and teaching hospitals; and (f) special separate facilities used to house scientific apparatus such as accelerators, oceanographic vessels, and computers.

Expenditures for administration buildings, steam plants, residence halls, and other such facilities should be **excluded** unless used principally for research, development, or instruction in the sciences and engineering. Land costs should be **excluded.**

REMINDER: Exclude research equipment purchased under research project awards from current fund accounts that are reported under items 1, 2, and 3.

ITEM 4. CAPITAL EXPENDITURES FOR FACILITIES AND EQUIPMENT FOR RESEARCH, DEVELOPMENT, AND INSTRUCTION, BY FIELD OF SCIENCE/ENGINEERING AND SOURCE OF FUNDS: FY 1985

Field of science/engineering		(Dollars in thousands)		
		Total (1)	Federal (2)	All other sources (3)
a. Engineering	1710	$	$	$
b. Physical sciences	1720			
c. Environmental sciences	1730			
d/e. Mathematical and computer sciences	1740			
f. Life sciences	1750			
g. Psychology	1760			
h. Social sciences	1770			
i. Other sciences, n.e.c.	1780			
j. Total (sum of a through i)	1700	$	$	$

ILLUSTRATIVE DISCIPLINES[1]

a. Engineering	
(1) Aeronautical & astronautical	Aerodynamics, aerospace, space technology
(2) Chemical	Petroleum, petroleum refining process
(3) Civil	Architectural, hydraulic, hydrologic, sanitary and environmental, structural transportation
(4) Electrical	Communication, electronic, power
(5) Mechanical	Engineering mechanics
(6) Other	Agricultural, ceramic, industrial and management, marine, metallurgical and materials, mining, nuclear, ocean engineering systems, polymer, textile, welding
b. Physical sciences	
(1) Astronomy	Astrophysics, optical and radio, x-ray, gamma-ray, neutrino
(2) Chemistry	Inorganic, organo-metallic, organic, physical, analytical, pharmaceutical, polymer sciences (exclude biochemistry)
(3) Physics	Acoustics, atomic and molecular, condensed matter, elementary particles, nuclear structure, optics, plasma
(4) Other	Used for multidisciplinary projects within physical sciences and for disciplines not requested separately
c. Environmental sciences	
(1) Atmospheric	Aeronomy, solar, weather modification, extraterrestrial atmospheres, meteorology
(2) Earth sciences	Engineering geophysics, general geology, geodesy and gravity, geomagnetism, hydrology, inorganic geochemistry, isotopic geochemistry, organic geochemistry, lab geophysics, paleomagnetism, paleontology, physical geography and cartography, seismology
(3) Oceanography	Biological oceanography, chemical oceanography, geological oceanography, physical oceanography, marine geophysics
(4) Other	Used for multidisciplinary projects within environmental sciences
d. Mathematical Sciences	Algebra, analysis, applied mathematics, foundations and logic, geometry, numerical analysis, statistics, topology
e. Computer sciences	Design, development, and application of computer capabilities to data storage and manipulation, information science
f. Life sciences	
(1) Agricultural	Agricultural chemistry, agronomy, animal science, conservation, dairy science, range science, wildlife
(2) Biological	Anatomy, biochemistry, biophysics, biogeography, ecology, embryology, entomology, genetics, immunology, microbiology, nutrition, parasitology, pathology, pharmacology, physical anthropology, physiology, plant science, botany, zoology, veterinary biology
(3) Medical	Anesthesiology, cardiology, endocrinology, gastroenterology, hematology, neurology, obstetrics, ophthalmology, preventive medicine and community health, psychiatry, radiology, surgery, veterinary medicine,[2] dentistry, pharmacy
(4) Other	Used for multidisciplinary projects within life sciences
g. Psychology	Animal behavior, clinical, educational, experimental, human development and personality, social
h. Social sciences	
(1) Economics	Econometrics, international, industrial, labor, agricultural, public finance and fiscal policy
(2) Political science	Regional studies, comparative government, international relations, legal systems, political theory, public administration
(3) Sociology	Comparative and historical, complex organizations, culture and social structure, demography, group interactions, social problems and welfare, theory
(4) Other	History of science, cultural anthropology, lingistics, socioeconomic geography
i. Other sciences, n.e.c.	To be used when the multidisciplinary and interdisciplinary aspects make the classification under one primary field impossible

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[1] Also, see enclosed "Crosswalk" between NSF field of science/engineering codes and the NCES Classification of Instructional Programs (NCES 81-323).

[2] Institutions with schools of veterinary medicine should distribute R&D expenditures among the appropriate disciplines (agricultural, biological, and medical) rather than only in medical sciences.

industrial research and development

purpose and background

The National Science Foundation (NSF) has sponsored this survey since 1953 to obtain data on the magnitude of and trends in research and development (R&D) efforts of industry in the United States. The survey collects data on the dollar volume of research and development, sources of financing, employment of R&D scientists and engineers [on a full-time-equivalent (FTE) basis], and other economic characteristics of industrial R&D performance.

survey instrument

The full questionnaire is sent to survey respondents in odd-numbered years. Since 1978, an abbreviated version of the survey that asks information on the most crucial data elements has been mailed in intervening years to reduce the reporting burden on companies.

Companies are queried on domestic sales; employment; R&D expenditures; number of FTE R&D scientists and engineers; sources of R&D funding (company or Federal); and other categories of research and development (basic, applied, and development) expenditures. Copies of the 1984 and 1985 survey forms are reproduced on the following pages.

sample design

The sample represents companies in all manufacturing industries and those nonmanufacturing industries known—on the basis of presurvey information—to conduct research and development. The sampling unit for the survey is the company which is defined as a business organization consisting of one or more establishments under common ownership or control.

Approximately every five years, a new survey panel of roughly 12,000 companies is selected and each is sent a questionnaire. Nearly 1,200 companies from the previous panel that were surveyed annually are retained in the new panel. Those firms reporting more than $1 million in R&D expenditures in the quinquennial survey are added to the list of companies surveyed annually; their data for subsequent years are estimated.

Companies are required by law to provide data for four items on the survey: net sales, total employment, total R&D expenditures, and federally funded R&D expenditures. The response rates of these questions are close to 100 percent. Response rates to other questions vary, but are, in general, significantly lower.

data availability

The 1986 industry survey is the 30th in the annual series sponsored by NSF and conducted by the Bureau of the Census. Two industry surveys covering the 1953-56 period were conducted for NSF by the Bureau of Labor Statistics (BLS). Data obtained from the BLS surveys are not directly comparable with the Census figures because of methodological and other differences in survey procedures. Time series covering approximately 30 years are available for major data elements.

data access

Data on individual companies cannot be released by Census because of proprietary considerations. Summary statistical tables containing aggregated data from this survey are available on diskettes prepared for use on an IBM-compatible microprocessor. Inquiries regarding this survey should be addressed to:

Ms. Melissa Pollak
Division of Science Resources Studies
Industry Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L602
Washington, D.C. 20550
(202) 634-4648

Additional tabulations of collected data, however, are occasionally available directly from the Bureau of the Census. The cost depends on the amount of detail involved. Information on the availability of data and costs may be obtained from:

Ms. Elinor Champion
Industry Division
Bureau of the Census
Department of Commerce
Washington, D.C. 20233
(301) 763-5616

FORM **RD-1 (I)**
(9-16-85)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
COLLECTING AND COMPILING AGENT FOR
THE NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20233

INSTRUCTIONS FOR SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1985

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GENERAL

Estimates Are Acceptable — Reporting on this form may require using informed estimates in answering some of the questions. These estimates are satisfactory if they are sufficient to develop both meaningful totals and, especially, measures of change from year to year. Direct any questions regarding this form to the Bureau of the Census, ATTN: Industry Division, Washington, D.C. 20233, or call (301) 763—5598.

Additional Forms — Photocopies of this form are acceptable. If you require additional copies of the form, write to the Bureau of the Census, 1201 East Tenth Street, Jeffersonville, Indiana 47132.

Companies Reporting in Survey for the First Time — Companies which did not report in the 1984 survey are asked to provide figures for both 1984 and 1985. If the company had no expenditures for research and development, complete only Item 1. Enter "No R&D" in the space for remarks on page 3 of the form, sign and return the form.

Figures for Earlier Years are Preposted on the Form — If your company reported for 1984, entries from that form have been copied on the present form. **Please describe in the "Remarks" section (page 3 of the form) the reasons for any substantial increases or decreases in the 1985 figures entered on this form when compared to corresponding 1984 figures.** Examples of such reasons are new government contracts, acquisitions and disposals, revised accounting method, etc. If you acquired or disposed of a unit performing an important amount of research and development during the 2-year period, please identify the unit in remarks, and give the total amount of research and development accounted for by such unit.

Revision of Earlier Year Figures — The 1984 figures should be revised if necessary to assure comparability with 1985 data. Please explain in remarks any significant change made in the 1984 figures. If no entries have been entered in the 1984 column, please fill in the figures for both years.

Certain items on this 1985 form are asked only every other year, and consequently no prior-year figures appear in the 1984 column. The figures your company reported in 1983 for these items are preposted, however, solely to assist you in reporting for 1985, and you are not required to make revisions in the 1983 data.

Report for Your Entire Company — Research and development (R&D) activities for your entire domestic company should be reported, including all subsidiaries, divisions, etc.

Period Covered by Report — The figures reported should cover the calendar year if possible. Fiscal year data, however, are acceptable for all items except employment. Please report employment figures (Item 1B and Item 3) for the specific period identified in each of the items mentioned.

Geographic Area Covered — The data relate to business firms which operate one or more establishments in one or more of the 50 States or the District of Columbia.

▶ Section I — GENERAL COMPANY DATA

► Item 1 — Sales and Employment for Company

► **Item 1A — Net Sales** — Report the net sales and receipts of this company and its subsidiaries to customers outside the company, including sales of products and services to other companies, individuals, U.S. Government agencies, foreign customers; etc. Include transfers to foreign subsidiaries. Exclude domestic intra-company transfers and sales by foreign subsidiaries. The reported figures should represent value f.o.b. plant after discounts and allowances and should exclude freight charges and excise taxes.

► **Item 1B — Employment** — Report the number of persons employed at the company in all activities in the 50 States or the District of Columbia during the pay periods which include March 12 of 1984 and 1985. This figure would be the same as that shown by the company in Item 14 of Treasury Form 941, if the company filed one Form 941 for the entire company.

▶ Section II — RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY IN THE UNITED STATES

► Item 2 — Research and Development Expenditures

Definition of Research and Development — Research and development includes basic and applied research in the sciences and in engineering, and design and development of prototype products and processes. For the purposes of this questionnaire, research and development includes activities carried on by persons trained, either formally or by experience, in the physical sciences including related engineering, and the biological sciences including medicine but excluding psychology, if the purpose of such activity is to do one or more of the following things:

1. Pursue a planned search for new knowledge, whether or not the search has reference to a specific application.

2. Apply existing knowledge to problems involved in the creation of a new product or process, including work required to evaluate possible uses.

3. Apply existing knowledge to problems involved in the improvement of a present product or process.

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried on by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of the questions.

Activities to be Excluded from Research and Development — Research and development for purposes of this survey excludes capital expenditures, routine product testing, research in the social sciences or psychology, or other nontechnological activities or technical services. Please exclude geological and geophysical exploration activities; include, however, the research and development conducted in support of such activities, such as the development or improvement of techniques and processes.

More specifically, exclude from research and development such nontechnological activities as market research, including statistical surveys, market development, economic research, and legal work in connection with patent applications and litigation and the sale or licensing of patents.

Also exclude from research and development such technical services as: quality and quantity control tests and analyses; trouble-shooting in connection with breakdowns in full-scale production, including related analytical work; work required for minor adaptations of a specific product to meet the requirements of a specific customer, including installation and servicing in a customer's plant; engineering and other technical services furnished in accordance with agreements to licensees outside the company; aid furnished by the R&D organization to manufacturing divisions to enable them to operate in accordance with previously determined formulas, standard practice instructions, or finished product specifications; technical plant sanitation control; aid furnished to develop advertising programs and to promote or demonstrate new products or processes, including the cost of material furnished for trial or demonstration; assistance in preparation of speeches and publications for persons not engaged in research and development; and experimental work performed at the request of the patent division to provide information needed during the prosecution of a patent litigation.

► **Item 3 — Research and Development Scientists and Engineers** — Scientists and engineers are defined for this survey as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics that is equivalent at least to that acquired through completion of a 4-year college course with a major in these fields, regardless of whether they actually hold a college degree in the field.

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. Records on the number of scientists and engineers assigned to research and development. This source is satisfactory when the scientists and engineers are assigned to research and development on a full-time basis (i.e., no more than 5 percent of their time is spent on non-research and development). Thus, for company laboratories performing only research and development, report the number of scientists and engineers on the rolls in January. For other situations, use source 2.

2. Figures on the proportion of total work time of scientists and engineers that is devoted to research and development. For example, if the engineering department of a manufacturing plant had 60 scientists and engineers in January 1986 and one-fourth of the scientists' and engineers' time during that month was charged to R&D projects, the figure for the number of R&D scientists and engineers included for that unit would be 15.

Separate figures are requested on the number of scientists and engineers working on Federal R&D projects, and company and other R&D projects. Where R&D work for the Government and for the company is performed by the same group of scientists and engineers, distribute the total number of such scientists and engineers according to the program, Federal or company, for which the R&D work was performed.

► **Item 4 — Costs INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED Within the Company by Major Type and Source of Funds** — Include all costs incurred to support research and development including R&D depreciation and overhead but excluding R&D capital expenditures. If you perform research and development for others on contract, report the total charged for the work performed, including profit.

Include in R&D expenditures the full cost of all research and development performed. Do not net your R&D expenditures by the amount of royalties received from either non-company organizations or company units, or the credits received for R&D work charged or "sold" to other units of the reporting company or to outside organizations.

The relevant costs for research and development usually include but are not limited to the elements listed below:

1. Wages, salaries, and related costs; materials and supplies consumed (or purchased, if consumption figures are not available); costs of computer software used in R&D activities, utilities, such as telephone, telex, electricity, water, gas, and fuel; books and periodicals; travel costs and professional dues.

2. Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities which the R&D organization uses; insurance expense; maintenance and repair, including the maintenance of buildings and grounds; depreciation on buildings, equipment, and vehicles; and rentals, if any facilities are leased.

3. Company overhead. Estimate a fair share of the cost of any functions which support R&D activities. The basis and method of estimating overhead costs will depend upon company practice. Be sure that the company figures include an allowance for overhead. Items normally covered in overhead include the following: personnel; accounting; procurement and inventory, including purchasing, storage, transportation, control of materials and supplies, etc.; other services, including legal and public relations; and salaries and related costs of research executives not on the payroll of the R&D organization.

Types of Costs to be Excluded from Research and Development Performed Within the Company — Exclude capital expenditures, royalties paid, patent expense, income taxes, and interest; the portion of company-held R&D contracts which were subcontracted to R&D organizations outside the reporting company; and income from the sale of products manufactured in the R&D organization if these were sold to bonafide customers. Also exclude the cost of research and development performed for the company by noncompany R&D organizations of any kind. (All work that was done for your laboratories and other technical units by noncompany organizations which are **not** R&D organizations—for example, model construction by a noncompany model shop—is to be included as a **purchase** of equipment, material, or supplies for the company research organization rather than as subcontracted research and development.) Exclude fellowships, grants, and gifts to promote research and development or the study of science and engineering.

Methods of Estimating Research and Development Expenditures by Type — (Basic, Applied, and Development) — If your company does not keep records that meet or can be allocated to these specific categories, estimate by:

1. Isolating the **projects** that clearly fall in the development category. If your company fabricates products, such development activity will include the design, construction, and testing of prototypes and models. Some defense contracts typically call for several test models. If your company's research and development frequently involves the development of a "process" as in chemicals and petroleum, such development activity would include operations beyond the bench scale, primarily the design and operations of pilot plants or semiworks.

2. Isolating the **organizational units** which have R&D activities that can be readily classified, based on the function assigned to the unit. If R&D work is done in production units as well as in various laboratories, it is generally of a development type.

3. Distributing the **balance** on the basis of a review of individual projects or on the basis of other summaries of the work. Please use the definitions for basic, applied, and development, as given below.

Types of Research

► **Item 4A — Basic Research** — Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific commercial objectives, although they may be in the fields of present or potential interest to the reporting company.

► **Item 4B1 — Applied Research** — Include the cost of research projects which represent investigation directed to discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes. Note that the chief difference between this definition of applied research and the definition of basic research is in terms of the objectives of the reporting company.

► **Item 4B2 — Development** — Include the cost of projects which represent technical activity concerned with nonroutine problems encountered in translating research findings or other general scientific knowledge into products or processes. Exclude routine technical services to customers or other items excluded from the definition of total research and development as explained in item 2 above.

Types of Activity Included in Development — Include the design and operation of pilot plants or semiworks plants as long as the principal purposes are to obtain experience and to compile engineering and other data to be used in such tasks as evaluating hypotheses, writing product formulas, establishing finished product specifications, designing special equipment and structures required by a process, and prepfaring operating instructions or manuals. Also include the engineering activity required to advance the design of a product or a process to the point where it meets specific functional and economic requirements and can be turned over to manufacturing units. Include the design, construction, and testing of preproduction prototypes and models and "engineering follow-through" in the early production phase; the development of designs for special manufacturing equipment and tools; the preparation of reports, drawings, formulas, specifications, standard practice instructions or operating manuals, and other media used to transmit to operating units information obtained from the above activities.

Types of Activity Excluded from Development — Exclude activities such as toolmaking and tool tryout, production of detailed construction drawings and manufacturing blueprints, and preproduction planning.

It is often difficult to decide when development ends and production begins. In general, if the primary objective is to make further improvements on the product or process, then the work comes within the definition of research and development. If, on the other hand, the product or process is substantially "set," and the primary objective is to develop market, do preproduction planning, or get the production process going smoothly, then the work is no longer research and development.

Source of Funds — Federal and Company

► **Item 4, Column 2 — Federal** — Include the cost of work done on Federal R&D contracts or subcontracts, and the R&D portions of procurement contracts and subcontracts during the year.

Do not include here, or elsewhere in the report, R&D contracts and the R&D portions of procurement contracts that you subcontracted to other R&D organizations. To do so would cause duplication in the statistical totals derived from these forms, which collect data on work actually performed by each company.

► **Item 4, Column 3 — Company and Other** — Include the cost of all company-sponsored research and development performed within the company as well as the research and development your company performed under contract from non-Federal sources. Exclude the research and development that was sponsored by your company but performed outside the company.

► **Item 4E — Company and Other Funds, except Federal, Budgeted for the year 1986** — Report the expected or estimated cost of company-sponsored or other non-federally sponsored research and development that will be performed within the company within the 50 States and the District of Columbia.

► **Item 5 — Costs Incurred for Federal Research and Development by Principal Agency** — Distribute the cost of Federal research and development work (item 4C, column 2) by Federal agency — If exact figures are not available by agency, please estimate or apportion according to the number of scientists and engineers working on the Federal projects and/or the costs of Federal programs.

► **Item 6 — Costs Incurred for Research and Development Performed Within the Company by Major Type of Expense** — If most research and development is performed in units where summaries are regularly prepared by element of cost, base the breakdown of research and development costs upon the records of such units. If existing records do not yield figures for this item, the item may be estimated.

► **Item 6A — Wages and Salaries** — Report the gross earnings paid in calendar year 1985 to employees engaged in research and development — (Follow the definition of salaries and wages that is used for calculating the withholding tax.) Include salaries of officers in the research establishment(s) if a corporation; exclude payments to proprietor or partners if an unincorporated concern. (Scientists and engineers are defined in item 3.)

► **Item 6B — Materials and Supplies** — Report the delivered cost for all purchased materials consumed, whether received from other companies, withdrawn from inventory, or received from other establishments of this company. Include all work that was done for your laboratories and other technical units by non-company organizations which are not research and development organizations (for example, model construction by a noncompany model shop). Exclude purchases from other research and development organizations.

► **Item 6C — Other Costs** — Include items related to your research and development activities and not included in items 6A and 6B. Include utilities, books and periodicals, property and other taxes, and company overhead.

► **Item 7 — Fields of Basic Research** — Use the following definitions to help you divide your company's basic research into broad research fields.

► **Item 7A — Chemistry** — Includes inorganic, organo-metallic, organic, and physical.

► **Item 7B — Engineering (including metallurgy)** — Includes aeronautical, astronautical (including aerospace and space technology), chemical, nuclear, civil, electrical, and mechanical engineering, etc.) and metallurgy and materials.

► **Item 7C — Geological Sciences** — Includes geodesy, hydrology, geochemistry, seismology, soil sciences, etc.

► **Item 7D — Mathematics** — Includes areas such as algebra; foundations and logic; geometry; numerical analysis, etc.

► **Item 7E — Computer Sciences** — Includes activities directed toward enhancing our understanding of computer structures and computational processes to provide bases for the future capabilities for computational solutions of presently intractable problems.

► **Item 7F — Physics** — Includes acoustics; atomic and molecular; condensed matter; elementary particle; nuclear structure; optics; plasma.

► **Item 7G — Astronomy** — Includes laboratory astrophysics; optical astronomy; radio astronomy; theoretical astrophysics; Gamma-ray, neutrino astronomy.

► **Item 7H — Atmospheric Sciences** — Includes aeronomy; solar; weather modification; extraterrestrial atmospheres; meteorology.

► **Item 7I — Oceanography** — Includes biological oceanography; chemical oceanography; physical oceanography; marine geophysics.

► **Item 7J — Biological Sciences** — Includes all sciences (other than clinical medical sciences) which deal with life processes, including plant and animal sciences, biochemistry, cell biology, nutrition, microbiology, physiology, etc.

► **Item 7K — Clinical Medical Sciences** — Includes all sciences concerned with the use of scientific knowledge for the identification, treatment, and cure of disease including internal medicine, neurology, preventive medicine and public health, pathology, pharmocology, psychiatry, dentistry, veterinary medicine, etc.

► **Item 7L — Other Sciences** — To be used for multidisciplinary and interdisciplinary projects which cannot be classified within one of the above primary fields of science.

► **Item 7M — Total Basic Research Cost** — This should be the same as Item 4A, column 4.

► **Item 8 — Applied Research and Development by Product Group** — Enter both Federal and total cost of applied research and development by product group. Costs should be entered in the field which is the END PRODUCT for the firm performing the research and development. For example, research and development in very large scale integrated (VLSI) circuits would be classified by a semiconductor firm in product group 25, electronic components and accessories, if the chips are the final product sold by the firm. The same type of microelectronic research and development by a computer firm, however, would be classified in group 19, office, computing and accounting machines, if the chip were intended to be part of a computer which is the firm's end product.

Fields of applied research and development are listed below. For those companies familiar with the Standard Industrial Classification (SIC), the 1972 SIC number of of numbers are given after each title. Note that the SIC definition here applies to **each field of research and development effort,** and not necessarily to the overall code in which your company's manufacturing output is classified.

Product Group

Atomic Energy Devices — Applied Research and Development on atomic energy devices should be included with research and development as classified in the categories listed on lines 1—34. Examples of the fields of research and development activities on atomic energy devices and the product groups in which such activities should be reported are as follows:

Activity	Product Group No.
Radioactive isotopes and other radiation sources	3
Partially fabricated reactor fuel element materials and control rods	11
Nuclear reactors; reactor components and equipment; core structurals; heat exchangers and condensers; valves; complete reactor fuel elements and control rods for use in propulsion, power plants, and other; and atomic waste casks	14
Fuel handling equipment, control rod drive mechanism and components for power plants, propulsion, and other; pressurizers, components, and auxiliary equipment; and pumps	20
Accessory instrumentation for reactor control	22
Atom smashers (particle acclerators)	24
Hot laboratory equipment, special instrumentation	31

1. Foods and Kindred Products (SIC 20) — Foods and beverages for human consumption and certain related products such as vegetable and animal fats and oils, and prepared feeds for animals and fowls.

2. Textile Mill Products (SIC 22) — Mill preparation of fibers and mill manufacture of yarn, thread, twine etc; manufacture of woven and knit fabric, carpets and rugs; dyeing and finishing fiber, yarn, and knit apparel; coating, waterproofing, or otherwise treating fabric; the manufacture of knit apparel; other finished articles from yarn, felt goods, lace goods, bonded fiber fabrics, and miscellaneous textiles.

3. Basic Industrial Inorganic and Organic Chemicals (SIC 281 and 286) — Includes alkalies and chlorine, industrial gases, inorganic pigments, and industrial inorganic chemicals not elsewhere classified. Also includes industrial organic chemicals including gum and wood chemicals, cyclic crudes, and cyclic intermediates, dyes, and organic pigments, and other industrial organic chemicals, n.e.c. Includes radioactive isotopes and other radiation sources.

4. Plastics Materials and Synthetic Resins, Synthetic Rubber, Synthetic and Other Manmade Fibers (SIC 282) — Includes cellulosic and noncellulosic fibers. Excludes glass which should be incuded in product group 11.

5. Drugs (SIC 283) — Medicinal chemicals, biological and botanical products, and pharmaceutical preparations.

6. Agricultural Chemicals (SIC 287) — Fertilizers, agricultural pesticides, and other agricultural chemicals.

7. All Other Chemicals (balance of SIC 28) — Explosives, soaps, glycerins, detergents and cleaning preparations, paints and varnishes, toilet preparations, and miscellaneous chemical products.

8. Petroleum Refining and Related Industries, Oil and Gas Extraction (SIC 13 and 29) — Excludes geological and geophysical exploration activities.

9. Rubber and Miscellaneous Plastics Products (SIC 30) — Fabricated rubber such as industrial and mechanical rubber goods and fabricated plastics products.

10. Stone, Clay, Glass, and Concrete Products (SIC 32) — Ceramics, glass, clay products, abrasives and asbestos products, cement, stone products, concrete products, and other nonmetallic mineral products.

11. Primary Ferrous Products (SIC 331, 332, 3399, and 3462) — Products of blast furnaces, steel works, rolling and finishing mills, iron and steel castings and forgings. Includes partially fabricated reactor fuel element materials and control rods.

12. Primary and Secondary Nonferrous Metals (balance of SIC 33 and 3463) — Primary and secondary smelting and refining of nonferrous metals, rolled, drawn, and extruded nonferrous metals products, castings and forgings.

13. Ordnance, Except Missiles (SIC 348, 3795) — Artillery, small arms, ammunition, tanks and parts, etc.

14. Fabricated Metal Products (SIC 34 except 3462, 3463, and 348, ferrous and nonferrous forgings, ordnance) — Tinwear, hand tools, nonelectric heating apparatus, fabricated structural metal products, metal stampings, fabricated wire products, etc., core structurals (barrels, cans, boxes, plates, etc.); heat exchangers, steam and barometric condensers; and valves. Nuclear reactors; reactor components and equipment.

15. Engines and Turbines (SIC 351) — Steam engines, steam, gas and hydraulic turbines, diesel and other internal combustion engines, n.e.c.

16. Farm and Garden Machinery and Equipment (SIC 352) — Farm machinery, including tractors for farm use.

17. Construction, Mining, and Material Handling Machinery and Equipment (SIC 353) — Construction mining, and oil field machinery and equipment, elevators, conveyors, hoists, industrial trucks, tractors, trailers, and stackers.

18. Metal Working Machinery and Equipment (SIC 354) — Machine tools, dies, machine tool accessories, rolling mill machinery, power driven hand tools, wire fabricating machinery and equipment, and automobile maintenance machinery and equipment.

19. Office, Computing, and Accounting Machines (SIC 357) — Electronic computing equipment; calculating and accounting machines; typewriters; other computing and office machines, (except laboratory scales and balances).

20. Other Machinery, Except Electrical (balance of SIC 35) — Special industrial machinery, except metalworking, such as food products machinery, textile and paper industries machinery, general industrial machinery and equipment, and miscellaneous machinery except electrical. Includes pumps, air and gas compressors, and industrial process furnaces and ovens. Includes atomic fuel holding equipment; control rod drive mechanism and components for use on nuclear reactors.

21. Electric Transmission and Distribution Equipment (SIC 361 and 3825) — Electric measuring instruments and test equipment, power distribution and specialty transformers, switchgear and switchboard transformers, etc.

22. Electrical Industrial Apparatus (SIC 362) — Electric motors and generators, motor starters and controls, welding apparatus, carbon and graphite brushes, electrodes. Nonelectronic capacitors, condensers, and rectifiers. Accessory instrumentation for reactor control.

23. Radio and Television Receiving Equipment, Except Communication Types (SIC 365) — Radio and television sets, home recorders, prerecorded magnetic tapes, microphones, speaker systems, turntables, phonograph records, etc.

24. Communication Equipment (SIC 366) — Telephone and telegraph apparatus, radio and television transmitting, signaling, and detection equipment and apparatus, radar equipment, electronic sighting devices, atom smashers, etc.

25. Electronic Components and Accessories (SIC 367) — Semiconductors, computer logic modules, computer chips, solid state electronic devices, integrated circuits, electronic capacitators, transformers, connectors, cathode ray tubes, nuclear detectors, solar cells, solid state photovoltaic devices, etc.

26. Other Electrical Machinery Equipment and Supplies (balance of SIC 36) — Household appliances, electric lighting and wiring equipment, and miscellaneous electrical machinery equipment and supplies.

27. Missiles (SIC 376) — Including frames or structures, launching and handling support equipment and work on the missile system as a whole. Exclude electronic guidance control subassemblies and radar which should be reported in product group 24. Exclude rocket motors which would be reported in product group 29.

28. Space Vehicles (SIC 376 part) — Include frames or structures, launching and handling support equipment and work on the space vehicle as a whole.

29. Aircraft and Parts (SIC 372) — Piloted and unpiloted aircraft and parts of all types, including engines and auxiliary equipment such as landing gear, de-icing equipment, and other auxiliary equipment specifically adopted for aircraft. Exclude radar and radio equipment and electronic sighting devices which should be reported in product group 24. Exclude aeronautical instruments which should be reported in product group 32.

30. Motor Vehicles and Equipment (SIC 371) — Applied research and development related to motor vehicles such as ambulances, fire engines, personnel carriers, amphibian motor vehicles, and truck and automobile trailers, and to motor vehicle equipment, etc.)

31. Other Transportation Equipment (balance of SIC 37 except 3795) — Shipbuilding, boatbuilding and repairing, railroad equipment, motorcycles, bicycles, and parts, etc. Exclude tanks and tank components which are in product 13.

32. Scientific and Mechanical Measuring Instruments (SIC 381, 382) — Engineering, laboratory, scientific, and research instruments, and associated equipment; automatic controls for regulating residential and commercial environments and appliances; industrial instruments for measurement, display, and control of process variables; nonelectric fire detecting systems; totalizing fluid meters and counting devices; instruments for measuring and testing electricity and electrical signals.

33. Optical, Surgical, Photographic, Timing and Other Instruments (SIC 383—87) — Optical instruments and lenses; surgical and medical instruments and apparatus; dental equipment and supplies; ophthalmic goods including contact lenses; optical fire control equipment; photographic equipment and supplies including film and motion picture appartus; watches, clocks, clockwork operated devices and parts, appliance timers, chronometers.

► **Item 9 — Cost of Research and Development Performed Within the Company, by State** — Report the cost of research and development for each state in which your company has research and development laboratories or facilities. It is not necessary to calculate separately individual assignments which may be made outside the home state of a particular research staff. As much as 10 percent of the total may, if desired, be reported in line 52 as "Not distributed by state."

► **Item 10 — Research and Development by Functional Category**

Energy Research and Development — Include all spending for research and development to increase energy resources or capabilities, including the development of energy equipment. If R&D spending is for joint or multiple purposes, estimate and report the portion of cost incurred due to the energy purpose. Do not include any of project cost if the **primary** purpose of the project is other than energy R&D. Energy R&D can include costs of R&D projects (both product and process) on exploration, extraction, transportation, processing, storage, generation (including conversion), distribution, conservation, etc., of present, new, or improved forms of energy. Record energy R&D spending according to type of energy.

► **Item 10B4** — Coal R&D Activities are to be Assigned into Subcategories. "Synthetic fuels" includes programs designed to convert coal to gaseous and liquid products. "Mining" is composed of programs for developing equipment and techniques to improve the productivity and recovery rates of coal mining.

► **Item 10C3** — "Conservation and utilization" includes R&D activities undertaken to reduce consumption either at the point of energy use or in the transmission, transportation, storage, and conversion of energy. Examples of such are research and development undertaken primarily to reduce fuel consumption in manufacturing, to improve the efficiency of transportation of energy products, or to produce an end product which is more efficient in energy consumption.

► **Item 10D** — "All other energy" includes areas such as wind, waste, hydroelectric, etc. Also include in this category the development of energy equipment which cannot be readily classified in Items 10A to 10C. In a limited number of cases, the separation of joint (multiple) costs which is in the preceding paragraphs may not be feasible. In this circumstance, include here the total project cost if the primary purpose of a project is energy research and development.

► **Pollution Abatement Research and Development** - Includes R&D spending for the purpose of reducing or eliminating the emission of pollutants. "Pollution" refers to the emissions of pollutants to the outside of a firm's (or household's) property or activities; "abatement" includes prevention, treatment or recycling. Exclude spending to contribute to environmental aesthetics, to increase equipment durability in corrosive environments, to conserve energy (include as energy R&D above) and natural resources, or to increase employee comfort, safety, and health.

If the purpose of the R&D project is pollution abatement only, include the total expenditures on the R&D project in Item 10J and in the appropriate subcategories. If the project has mixed purposes, estimate and report where possible only the portion of costs incurred due to the pollution abatement purpose. If a separation of joint costs cannot be made, then decide whether the R&D project is primarily (more than 50 percent) for pollution abatement. If so, then include the total cost of the project in Item 10J and in the appropriate subcategories. If the project is **not** primarily for pollution abatement, then exclude all of the project cost. Exclude project costs if expected pollution abatement benefits are incidental. (Incidental benefits are those obtained at no extra cost.)

► **Item 10F — Air** — 1. Automotive emissions includes all R&D efforts undertaken to reduce exhaust emissions from automobiles. 2. Electric power plant emissions includes efforts directed toward reducing airborne emissions from electric power plants. 3. "All other" includes efforts directed at removing sulfur oxide, nitrogen oxides and particulates, and other fossil-fuel pollutants from the atmosphere.

► **Item 10G — Water** — Includes R&D spending on water recirculation or thermal pollution abatement, etc.

► **Item 10H — Solid Waste** — Includes R&D spending on waste compacting devices, etc.

► **Item 10I — Other** — Includes R&D spending on pollution abatement from noise and radiation, etc.

► **Item 11 — Product Versus Process Applied Research and Development** — Allocate the total applied research and development dollar figures of Item 4B3 column 4, to either product or process research and development, Items 11A and 11B. Include in your allocation any company overhead associated with the applied research and development that was included in the dollar figures of Item 4B3.

If you are unsure whether the research and development is for a process or a product, refer to the definitions for each item below. If the expenditures are unclassifiable as either product or process, enter the cost of such research in the unclassifiable category, Item 11C.

► **Item 11A — Product Applied Research and Development Costs** — Costs for applied research and development oriented towards goods that have the potential for sale to the public or to other firms. R&D work should be classified as a cost for product research and development. If it clearly involves making a product feasible or is an integral part of product modification, rather than affecting the efficiency with which the product is made.

► **Item 11B — Process Applied Research and Development Costs** — Costs for applied research and development devoted to reducing costs, increasing production efficiency, or increasing output by improving the manufacturing process.

► **Item 11C — Unclassifiable Applied Research and Development Costs** — Applied research and development costs which cannot be classified as product or process, based upon the above definitions. Do not include in this item company **overhead costs** related to projects which can be classified into product or process research and development. These costs should be in Items 11A and 11B and NOT considered an unclassifiable expense for Item 11C.

► **Item 11D — Total** — Add together the totals for Items 11A through 11C and enter amounts in the appropriate columns.

► **Item 12 — Long Versus Short Term Research and Development Costs** — Allocate the total R&D dollar figures of Item 4C columns 2 and 4 ("FEDERAL" and "TOTAL"), based on the actual or estimated future life of each of your projects in the R&D cycle, into three time period categories. A distinction should be made between continuing programs and specific projects. While programs in broad areas may continue for long periods of time, you are asked to treat independently specific projects with separate budgets, definable goals, and project lives, except where projects are sequential, i.e., one depending on the other to reach a specified goal. Treat the sequence as a single project.

► **Item 12A — Less Than or Equal to 2-Year Project Life** — Include the current year's costs for all projects whose total life in the R&D cycle is expected to be less than or equal to 2 years from inception to completion or termination. Completion refers to the R&D phase only. At the time production planning, design, and engineering begin, research and development is usually over.

► **Item 12B — 2- to 5-year Project Life** — Includes the current year cost of all projects whose total life in the R&D cycle has been or is expected to be more than 2 years but less than or equal to 5 years.

► **Item 12C — More than 5-Year Project Life** — Include the current year cost of all projects whose total life in the R&D cycle has been or is expected to be more than 5 years.

Company overhead or other costs included in Item 4C should be allocated to Items 12A, 12B, or 12C. The sum of 12A, 12B, and 12C should be equal to Item 4C.

► **Section III — RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE COMPANY — (R&D not included in Item 4).**

► **Item 13 — Total Company Funds Spent for Research and Development Activities Performed Outside the Company Within the United States** — Includes payments for research and development activities in the form of contracts, grants, fellowships, etc., made to other industrial firms, commercial laboratories, consultants, educational institutions, hospitals, research institutions, etc. (Please exclude subcontracting of R&D contracts received from the Federal Government or other companies.)

► **Item 14 — Total Company Funds Spent for Research and Development Activities Performed by Foreign Subsidiaries Outside the United States** — Report the amount of research and development financed by the U.S. parent or its foreign subsidiaries and performed by company R&D laboratories, branch plants, divisions, etc., or by other organizations, located outside the United States. This item excludes R&D activities performed by foreign subsidiaries which were financed by foreign governments or other outside organizations.

NOTE — Foreign subsidiaries are those outside the 50 States or the District of Columbia.

DUE DATE: 60 DAYS AFTER RECEIPT OF FORM ☐ OMB No. 3145-0027: Approval Expires July 31, 1987

NOTICE — Your report to the Census Bureau is confidential by law (title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are immune from legal process.

Bureau of the Census
1201 East Tenth Street
Jeffersonville, Indiana 47132

Name of person who supplied 1984 data

Data supplied in Items 1A and 1B and in Item 4C, columns 2 and 4, for 1985 on this form, will satisfy the mandatory reporting requirement of Census Form MA-121 (title 13, U.S. Code). Your cooperation on the other items is essential to make the results of this survey comprehensive, accurate, and timely.

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FORM **RD-1**

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
COLLECTING AND COMPILING AGENT FOR
THE NATIONAL SCIENCE FOUNDATION

SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1985

In correspondence pertaining to this report refer to this **CENSUS FILE NUMBER (11 digits)** ▶

PLEASE RETURN THIS COPY
(Please correct any error in name and address, including ZIP code.)

GENERAL INSTRUCTIONS

- Please complete this form and return within 60 days in the envelope provided. Retain the file copy for your records. THIS REPORT SHOULD COVER YOUR ENTIRE COMPANY, INCLUDING ALL SUBSIDIARIES, UNLESS OTHERWISE DESIGNATED.
- Enter 0 (zero) where appropriate rather than leaving a blank space.
- Reasonably accurate estimates are acceptable.
- Figures for 1983 are those reported by your company in that year. They are included solely to assist you in reporting 1985 data.
- Figures for 1984 are those reported by your company last year. THE 1984 FIGURES SHOULD BE REVISED, IF NECESSARY, TO BE COMPARABLE WITH 1985 DATA.
- Explain in "Remarks" on the back page any substantial increases or decreases in 1985 figures over 1984 (e.g., new government contracts, acquisitions, mergers, divestitures, etc.)

PLEASE READ ENCLOSED INSTRUCTIONS BEFORE COMPLETING THIS FORM

SECTION I — GENERAL COMPANY DATA

Item 1 — DOMESTIC SALES, RECEIPTS, AND EMPLOYMENT FOR COMPANY	1984	1985
A. Domestic net sales and receipts of this company *(Thousands of dollars)*	101	102
B. Total domestic company employment in all activities during the pay period which includes the 12th of March 1984 and 1985	103	104

SECTION II — RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY IN THE UNITED STATES

(Exclude R&D financed by the company but performed by others. Report such R&D in section III.)

Item 2 — RESEARCH AND DEVELOPMENT EXPENDITURES

Are research and development expenditures for entire domestic company, including subsidiaries, reported on this form? ☐ YES ☐ NO — *Please explain in remarks or on transmittal letter*

Item 3 — NUMBER OF SCIENTISTS AND ENGINEERS INVOLVED IN RESEARCH AND DEVELOPMENT ACTIVITIES Apportion on a full-time equivalent basis. *(See instruction manual)*	January 1985	January 1986
A. Federal research and development		111
B. Company and other research and development		112
C. TOTAL *(Sum of A and B)* ⟶	113	114

Item 4 — COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY MAJOR TYPE AND SOURCE OF FUNDS

Include R&D depreciation and overhead; exclude R&D capital expenditures. *(See instruction manual)*

		Thousands of dollars			
		1984	1985		
		TOTAL research and development (1)	Federal funds (2)	Company and other funds, except Federal (3)	TOTAL *(Sum of columns 2 and 3)* (4)
A. Basic research *If "None," please mark (X)* ▷ ☐		201	202	203	204
B. Applied research and development	1. Applied research	211	212	213	214
	2. Development	221	222	223	224
	3. TOTAL *(Sum of lines 1 and 2)*	231	232	233	234
C. TOTALS *(Sum of A and B3)* ⟶			242	243	244
D. 1984 TOTALS ⟶			252	253	254
E. Company and other funds, except Federal, budgeted for the year 1986 ⟶				263	

Item 5 — COSTS INCURRED FOR FEDERAL RESEARCH AND DEVELOPMENT BY PRINCIPAL AGENCY *(Breakdown of Item 4C, column 2)*	*Thousands of dollars*		
	1983	1984	1985
1. Department of Defense		NOT ASKED	301
2. National Aeronautics and Space Administration			302
3. Department of Energy			303
4. All other Federal Agencies			304
5. TOTAL COST *(Sum of 1, 2, 3, and 4)* ⟶			305

Item 6 — COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THIS COMPANY BY MAJOR TYPE OF EXPENSE	*Thousands of dollars*		
	1983	1984	1985
A. Wages and salaries of research and development personnel *(Include scientists and engineers, technicians, secretaries, and other personnel)*		NOT ASKED	311
B. Costs of materials and supplies consumed *(Do not include in this item components, models, and other materials supplied by other research organizations)*			312
C. Other costs *(Include service and supporting costs, R&D depreciation, and share of overhead)*			313
D. TOTAL COSTS *(Sum of A through C) (Same as item 4C, column 4)* ⟶			314

(RD-1-1) *PLEASE CONTINUE ON NEXT PAGE*

FORM RD-1 (Items 7, 8, 9)

SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1985

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
COLLECTING AND COMPILING AGENT FOR
THE NATIONAL SCIENCE FOUNDATION

Refer to this CENSUS FILE NUMBER in any correspondence pertaining to this report

SECTION II — RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY IN THE UNITED STATES — Continued

(Exclude R&D financed by the company but performed by others. Report such R&D in section III.)

Item 7 — FIELDS OF BASIC RESEARCH

Allocate the total reported in item 4A for basic research into the following fields of science and engineering.

	Thousands of dollars 1983	1984	1985
A. Chemistry		NOT ASKED	401
B. Engineering (including metallurgy)			402
C. Geological sciences			407
D. Mathematics			408
E. Computer sciences			409
F. Physics			410
G. Astronomy			411
H. Atmospheric sciences			412
I. Oceanography			413
J. Biological sciences			414
K. Clinical medical sciences			415
L. Other — *Specify*			417
M. TOTAL BASIC RESEARCH COST *(Same as item 4A, column 4)* →			418

Item 8 — APPLIED RESEARCH AND DEVELOPMENT BY PRODUCT GROUP

Allocate the total reported in 4B, line 3, applied research and development, into the following product groups which represent the END PRODUCT for the firm.

(See instructions on how to classify the applied research and development)

	Thousands of dollars 1983		1984	1985	
	Federal	Total		Federal	Total
1. Food and kindred products			NOT ASKED	501	502
2. Textile mill products				503	504
3. Industrial inorganic and organic chemicals				505	506
4. Plastics materials and synthetic resins, rubber, and fiber				507	508
5. Drugs				509	510
6. Agricultural chemicals				511	512
7. All other chemicals				513	514
8. Petroleum refining				515	516
9. Rubber and miscellaneous plastics products				517	518
10. Stone, clay, glass, and concrete products				519	520
11. Primary ferrous products				521	522
12. Primary and secondary nonferrous metals				523	524
13. Ordnance, except missiles				525	526
14. Fabricated metal products				527	528
15. Engines and turbines				529	530
16. Farm machinery and equipment				531	532
17. Construction, mining, and materials handling machinery				533	534
18. Metalworking machinery and equipment				535	536
19. Office, computing and accounting machines				537	538
20. Other machinery, except electrical				539	540
21. Electric transmission and distribution equipment				541	542
22. Electrical industrial apparatus				543	544
23. Radio and television receiving sets, except communication types				545	546
24. Communications equipment				547	548
25. Electronic components and accessories				549	550
26. Other electrical machinery equipment and supplies				553	554
27. Missiles				555	556
28. Space vehicles				557	558
29. Aircraft and parts				559	560
30. Motor vehicles and equipment				561	562
31. Other transportation equipment				563	564
32. Scientific and mechanical measuring instruments				565	566
33. Optical, surgical, photographic, and other instruments				567	568
34. Other — *Specify*				571	572
35. TOTAL APPLIED RESEARCH AND DEVELOPMENT COSTS *(Same as item 4B3, columns 2 and 4)* →				573	574

Item 9 — COST OF RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY, BY STATE

Allocate the totals reported in item 4C, columns 2 and 4, by the States in which your various research and development laboratories or facilities are located. Estimate the costs associated with each State. If necessary, you may report up to 10 percent of your total as "Not distributed by State."

State	Thousands of dollars 1983		1984	1985	
	Federal	Total		Federal	Total
1. AL			NOT ASKED	601	602
2. AK				603	604
3. AZ				605	606
4. AR				607	608
5. CA				609	610
6. CO				611	612
7. CT				613	614
8. DE				615	616
9. DC				617	618
10. FL				619	620
11. GA				621	622
12. HI				623	624
13. ID				625	626
14. IL				627	628
15. IN				629	630
16. IA				631	632
17. KS				633	634
18. KY				635	636
19. LA				637	638
20. ME				639	640
21. MD				641	642
22. MA				643	644
23. MI				645	646
24. MN				647	648
25. MS				649	650
26. MO				651	652

State	Thousands of dollars 1983		1984	1985	
	Federal	Total		Federal	Total
27. MT			NOT ASKED	653	654
28. NE				655	656
29. NV				657	658
30. NH				659	660
31. NJ				661	662
32. NM				663	664
33. NY				665	666
34. NC				667	668
35. ND				669	670
36. OH				671	672
37. OK				673	674
38. OR				675	676
39. PA				677	678
40. RI				679	680
41. SC				681	682
42. SD				683	684
43. TN				685	686
44. TX				687	688
45. UT				689	690
46. VT				691	692
47. VA				693	694
48. WA				695	696
49. WV				697	698
50. WI				699	700
51. WY				701	702
52. *				703	704
53. TOTAL COSTS *(Same as item 4C, columns 2 and 4)* →				705	706

*Not distributed by State

PLEASE CONTINUE ON NEXT PAGE

Form RD-1 (Items 10 through 16)

SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1985

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
COLLECTING AND COMPILING AGENT FOR
THE NATIONAL SCIENCE FOUNDATION

Refer to this
CENSUS FILE NUMBER
in any correspondence
pertaining to this report

SECTION II — RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY IN THE UNITED STATES — Continued

(Exclude R&D financed by the company but performed by others. Report such R&D in Section III.)

Item 10 — RESEARCH AND DEVELOPMENT BY FUNCTIONAL CATEGORY

Of the total reported in Item 4C, columns 2 and 4, report the following functional categories.

ENERGY RESEARCH AND DEVELOPMENT Include the project cost or portion of project cost incurred for the purpose of increasing energy resources or capabilities. Include cost by type of energy.	*Thousands of dollars*					
	1984		1985		1986	
	Federal funds	Total funds	Federal funds	Total funds	Projected Federal funds	Projected total funds
A. Total nuclear	801	802	803	804	805	806
1. Fission	NOT ASKED	NOT ASKED	807	808	809	810
2. Fusion			811	812	813	814
B. Total fossil fuels	815	816	817	818	819	820
1. Oil	NOT ASKED	NOT ASKED	821	822	823	824
2. Gas			825	826	827	828
3. Shale			829	830	831	832
4. Coal			833	834	835	836
a. Synthetic fuels			837	838	839	840
b. Mining			841	842	843	844
c. All other			845	846	847	848
5. Other fossil fuels			849	850	851	852
C. Total geothermal, solar, conservation and utilization	853	854	855	856	857	858
1. Geothermal	NOT ASKED	NOT ASKED	859	860	861	862
2. Solar			863	864	865	866
3. Conservation and utilization			867	868	869	870
D. All other energy	871	872	873	874	875	876
E. Total of A through D →	877	878	879	880	881	882

POLLUTION ABATEMENT RESEARCH AND DEVELOPMENT Include the project cost or portion of the project cost incurred for the purposes of designing pollution abatement products or product characteristics or of designing pollution abatement features into processes. Include cost by form of pollution to be abated.	*Thousands of dollars*					
	1984		1985		1986	
	Federal funds	Total funds	Federal funds	Total funds	Projected Federal funds	Projected total funds
F. Air	NOT ASKED	NOT ASKED	901	902	903	904
1. Automotive emissions			905	906	907	908
2. Electric power plant emissions			909	910	911	912
3. All other			913	914	915	916
G. Water			917	918	919	920
H. Solid waste			921	922	923	924
I. Other			925	926	927	928
J. Total of F through I →	929	930	931	932	933	934

Item 11 — PRODUCT VERSUS PROCESS APPLIED RESEARCH AND DEVELOPMENT

Allocate the total applied research and development dollar figures of Item 4B3, column 4, to product, process, or unclassifiable R&D. *(If company records do not reveal exact data for this item, please submit your best estimate for the allocation.)*

	Thousands of dollars		
	1983	1984	1985
A. Product research and development		NOT ASKED	951
B. Process research and development			952
C. Unclassifiable as to product or process			953
D. Total *(Sum of A through C)* →			954

Item 12 — LONG VERSUS SHORT TERM RESEARCH AND DEVELOPMENT COSTS

Allocate the total R&D dollar figures of Item 4C, columns 2 and 4, "Federal" and "Total" based on the actual and estimated future life of each of your projects in the R&D cycle, into the following three categories: *(If company records do not reveal exact data for this item, please submit your best estimate for the allocation.)*

	Thousands of dollars				
	1983		1984	1985	
	Federal	Total		Federal	Total
A. Projects whose total life in the R&D cycle is less than or equal to 2 years			NOT ASKED	961	962
B. Projects whose total life in the R&D cycle is more than 2 years but less than or equal to 5 years				963	964
C. Projects whose total life in the R&D cycle is more than 5 years				965	966

SECTION III — RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE DOMESTIC COMPANY WITH COMPANY FUNDS

Not included in item 4

Item 13 — TOTAL COMPANY FUNDS FOR RESEARCH AND DEVELOPMENT ACTIVITIES FINANCED BY THE COMPANY BUT PERFORMED BY OTHERS OUTSIDE THE COMPANY WITHIN THE UNITED STATES

Include other industrial firms, colleges and universities, nonprofit organizations, etc. Exclude subcontracting of Federal government and other contracts. *(See instruction manual)*

Thousands of dollars		
1983	1984	1985
	NOT ASKED	971

Item 14 — TOTAL COMPANY FUNDS SPENT FOR RESEARCH AND DEVELOPMENT ACTIVITIES PERFORMED BY FOREIGN SUBSIDIARIES OR BY OTHER ORGANIZATIONS OUTSIDE THE UNITED STATES

Thousands of dollars	
1984	1985
972	973

Item 15 — STATUS OF THIS COMPANY ON DECEMBER 31, 1985

A. Was the company listed in the address label owned or controlled by another company on December 31, 1985? ☐ Yes — *Complete item 15B* ☐ No

B. New owner information

Name 985		Date acquired 986
Address *(Number and street)* 987		
City 988	State 989	ZIP code 990

REMARKS — *If more space is required, continue on reverse.*

991

Item 16 — CERTIFICATION — This report is substantially accurate and has been prepared in accordance with instructions.

Key	Name of person to contact regarding this report — *Print or type*			Mo.	Day	Year
992						
	Telephone			Signature of authorized official		
993	Area code	Number	Extension			

FORM **RD-1 (I)**
(10-23-84)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
COLLECTING AND COMPILING AGENT FOR
THE NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20233

INSTRUCTIONS FOR SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1984

Outline of instructions

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GENERAL

Estimates are Acceptable — Reporting on this form may require using informed estimates in answering some of the questions. These estimates are satisfactory if they are sufficient to develop both meaningful totals and, especially, measures of change from year to year. Direct any questions regarding this form to the Bureau of the Census, ATTN: Industry Division, Washington, D.C. 20233, or call (301) 763–5598.

Companies Reporting in Survey for the First Time — Companies which did not report in the 1983 survey are asked to provide figures for both 1983 and 1984. If the company had no expenditures for research and development, complete only Item 2. Enter "No R&D" in the space for remarks on page 2 of the form, sign, and return the form.

Figures for Earlier Years are Preposted on the Form — If your company reported for 1983, entries from that form have been copied on the present form.

Please describe in the "Remarks" section (page 2 of the form) the reasons for any substantial increases or decreases in the 1984 figures entered on this form when compared to corresponding 1983 figures. Examples of such reasons are new government contracts, acquisitions, and divestitures revised accounting method, etc. If you acquired or disposed of a unit performing an important amount of research and development during the 2-year period, please identify the unit in remarks, and give the total amount of research and development accounted for by such unit.

Revision of Earlier Year Figures — The 1983 figures should be revised if necessary to assure comparability with 1984 data. Please explain in remarks, any significant change made in the 1983 figures. If your company did not report for 1983, or if no entries have been entered in the 1983 column, fill in the figures for both years.

GENERAL — Continued

Report for Your Entire Company — Research and development (R&D) activities for your entire domestic company should be reported, including all subsidiaries, divisions, etc.

Period Covered by Report — The figures reported should cover the calendar year if possible. Fiscal year data, however, are acceptable for all items except employment, provided your fiscal year ends between September and March. Please report employment figures (Item 2B and Item 4) for the specific period identified in each of the items mentioned.

Geographic Area Covered — The data relate to business firms which operate one or more establishments in one or more of the 50 States or the District of Columbia.

▶ Section I — GENERAL COMPANY DATA

▶ Item 1 — Name and Address of Company

▶ Item 2 — Sales and Employment for Company

Item 2A — Net Sales — Report the net sales and receipts of this company and its subsidiaries to customers outside the company. (Exclude domestic intra-company transfers and sales by foreign subsidiaries; include, however, transfers to such foreign subsidiaries as well as export sales to foreign companies.) The reported figures should represent value f.o.b. plant after discounts and allowances and should exclude freight charges and excise taxes.

Item 2B — Employment— Report the number of persons employed at the company in all activities in the 50 States or the District of Columbia during the pay period which includes March 12 of 1983 and 1984. This figure would be the same as that shown by the company in Item 14 of Treasury Form 941, if the company filed one Form 941 for the entire company.

▶ Item 3 — RESEARCH AND DEVELOPMENT EXPENDITURES

Definition of Research and Development — Research and development includes basic and applied research in the sciences and in engineering, and design and development of prototype products and processes. For the purposes of this questionnaire, research and development includes activities carried on by persons trained, either formally or by experience, in the physical sciences including related engineering, and the biological sciences including medicine but excluding psychology, if the purpose of such activity is to do one or more of the following things:

1. Pursue a planned search for new knowledge, whether or not the search has reference to a specific application.

2. Apply existing knowledge to problems involved in the creation of a new product or process, including work required to evaluate possible uses.

3. Apply existing knowledge to problems involved in the improvement of a present product or process.

Research and development includes the activities described above whether assigned to separate research and development organizational units of the company or carried on by company laboratories and technical groups not part of an R&D organization. The reporting of activities of such latter groups may require the use of estimates for some of the questions.

Activities to be Excluded From Research and Development — Research and development for purposes of this survey excludes capital expenditures, routine product testing, research in the social sciences or psychology, or other nontechnological activities or technical services. Please exclude geological and geophysical exploration activities; include, however, the research and development conducted in support of such activities, such as the development or improvement of techniques and processes.

More specifically, exclude from research and development such nontechnological activities as market research, including statistical surveys, market development, economic research, and legal work in connection with patent applications and litigation, and the sale of licensing of patents.

Also exclude from research and development such technical services as: quality and quantity control tests and analyses; troubleshooting in connection with breakdowns in full-scale production, including related analytical work; technical plant sanitation control; work required for minor adaptations of a specific product to meet the requirements of a specific customer, including installation and servicing in a customer's plant; engineering and other technical services furnished in accordance with agreements to licensees outside the company; aid furnished by the R&D organization to manufacturing divisions to enable them to operate in accordance with previously determined formulas, standard practice instructions, or finished product specifications; aid furnished to develop advertising programs and to promote or demonstrate new products or processes, including the cost of material furnished for trial or demonstration; assistance in preparation of speeches and publications for persons not engaged in research and development; and experimental work performed at the request of the patent division to provide information needed during the prosecution of a patent litigation.

▶ Section II — RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY IN THE UNITED STATES

▶ Item 4 — Research and Development Scientists and Engineers — Scientists and engineers for this survey are defined as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics, equivalent at least to that acquired through completion of a four-year college course with a major in these fields, regardless of whether they held a college degree in the field.

▶ Item 4 — Research and Development Scientists and Engineers — Continued

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. Records on the number of scientists and engineers assigned to research and development. This source is satisfactory as long as the scientists and engineers of the unit are assigned to research and development on a full-time basis (i.e., no more than 5 percent of their time is spent on nonresearch and development). For example, for company laboratories performing only research and development, report the number of scientists and engineers on the rolls in January. For other units, use source 2.

2. Figures on the proportion of total work time of scientists and engineers that is devoted to research and development. For example, if the engineering department of a manufacturing plant had 60 scientists and engineers in January 1984 and one-fourth of the scientists' and engineers' time during that month was charged to R&D projects, the figure for the number of R&D scientists and engineers included for that unit would be 15.

Separate figures are requested on the number of scientists and engineers working on Federal and company and other R&D projects. Where R&D work for the Government and for the company is performed by the same group of scientists and engineers, distribute the total number of such scientists and engineers according to the program, Federal or company, for which the R&D work was performed.

▶ Item 5 — Cost or Receipts for Research and Development Performed Within the Company by Major Type and Source of Funds — Include all costs incurred to support research and development including depreciation and overhead but excluding capital expenditures. If you perform research and development for others on contract, include the total charged for the work performed, including profit.

The relevant costs usually include but are not limited to the elements listed below:

1. Wages, salaries, and related costs. Materials and supplies consumed (or purchased, if consumption figures are not available); costs of computer software used in activities; utilities, such as telephone, telex, electricity, water, gas, and fuel; books and periodicals; travel and entertainment costs and professional dues.

2. Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities which the R&D organization uses; insurance expense; maintenance and repair, including the maintenance of buildings and grounds; depreciation on buildings, equipment, and vehicles; and rentals, if any facilities are leased.

3. Company overhead. Estimate a fair share of the cost of any functions which support activities. The basis and method of estimating overhead costs will depend upon company practice. Be sure that all companies include an allowance for overhead. Items normally covered in overhead include the following: Personnel; accounting; procurement and inventory, including purchasing, storage, transportation, control, and of materials and supplies; other services, including legal, public relations, duplicating, maintenance of motor vehicles, stenographic service, salaries and related costs of research executives not on the payroll of the research and development organization.

Include in R&D expenditures the full cost of all research and development performed; do not net your R&D expenditures by the amount of royalties received from either non-company organizations or company units, or the credits received for R&D work charged or "sold" to other units of reporting company or to outside organizations.

Types of Expense to be Excluded From The Cost of Research and Development Performed Within The Company — Exclude capital expenditures, royalties paid, patent expense, income taxes, or interest; the cost of research and development performed for the company by noncompany R&D organizations of any kind; and income from sale of products manufactured in the R&D organization if these were sold to bonafide customers. Also exclude the portion of company-held R&D contracts which were subcontracted to R&D organizations outside the reporting company. (All work that was done for your laboratories and other technical units by noncompany organizations which are not R&D organizations — for example, model construction by a noncompany model shop — is to be considered as a **purchase** of equipment, material, or supplies for the company research organization rather than as subcontracted research and development.) Exclude fellowships, grants, and gifts to promote research and development or the study of science and engineering.

Methods of Estimating Research and Development Expenditures by Type — (Basic, Applied, and Development) — If your company does not keep records that meet or can be allocated to these specific categories, estimate by:

1. Isolating the **projects** that clearly fall in the development category. If your company fabricates products, such development activity will include the design, construction, and testing of prototypes and models. Some defense contracts typically call for several test models. If your company's research and development frequently involves the development of a "process" as in chemicals and petroleum, such development activity would include operations beyond the bench scale, primarily the design and operations of pilot plants or semiworks.

2. Isolating the **organizational units** which have R&D activities that can be readily classified.

3. Distributing the **balance** on the basis of a review of individual projects or on the basis of other summaries of the work. Please use the definitions for basic, applied, and development, as given below.

Item 5A — Basic Research — Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific commercial objectives, although they may be in the fields of present or potential interest to the reporting company.

Item 5B1 — Applied Research — Include the cost of research projects which represent investigation directed to discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes. Note that the chief difference between this definition of applied research and the definition of basic research is in terms of the objectives of the reporting company.

Item 5B2 — Development — Include the cost of projects which represent technical activity concerned with nonroutine problems encountered in translating research findings or other general scientific knowledge into products or processes. Exclude routine technical services to customers or other items excluded from the definition of total research and development in Section I above.

Types of Activity Included in Development — Include the design and operation of pilot plants or semiworks plants as long as the principal purposes are to obtain experience and to compile engineering and other data to be used in evaluating hypotheses, in writing product formulas, or in establishing finished product specifications, in designing special equipment and structures required by a process, and in preparing operating instructions or manuals. Also include the engineering activity required to advance the design of a product or a process to the point where it meets specific functional and economic requirements and can be turned over to manufacturing units; and further improvements on the products or processes, include the design, construction, and testing of preproduction prototypes and models and "engineering follow-through" in the early production phase; the development of designs for special manufacturing equipment and tools; the preparation of reports, drawings, formulas, specifications, standard practice instructions or operating manuals, and other media for transmitting to operating units information obtained from the above activities.

Types of Activity Excluded from Development — Exclude toolmaking and tool tryout; production of detailed construction drawings and manufacturing blueprints; work to develop markets; preproduction planning; work to smooth the production process.

Source of Funds — Federal and Company

Definitions of "Federal" and of "Company and Other"

Item 5, Column 2 — Federal — Include the cost of work done on Federal R&D contracts or subcontracts, and the R&D portions of procurement contracts and subcontracts during the year.

Do not include here, or elsewhere in the report, research and development contracts and the portions of procurement contracts that you subcontracted to other organizations. To do so would cause duplication in the statistical totals derived from these forms, which report work actually performed.

Item 5, Column 3 — Company and Other — Include the cost of all company-sponsored research and development performed within the company as well as the research and development your company performed under contract from non-Federal sources. Exclude the research and development that was sponsored by your company but performed outside the company.

Item 5E — Report the expected or estimated cost of company-sponsored research and development that will be performed within the company within the 50 States and the District of Columbia during 1985.

Item 6 — Research and Development by Functional Category

Items 6A to 6E — Energy Research and Development — Include all spending for research and development to increase energy resources or capabilities, including the development of energy equipment. If R&D spending is for joint or multiple purposes, estimate and report the portion of cost incurred for the energy purpose. Do not include any of the project costs if the **primary** purpose of the project is other than energy R&D. Energy R&D can include costs of R&D projects (both product and process) on exploration, extraction, transportation, processing, storage, generation (including conversion), distribution, conservation, etc., of present, new, or improved forms of energy. Record energy R&D spending according to type of energy.

Item 6C — "Conservation and Utilization" includes R&D activities undertaken to reduce consumption either at the point of energy use or in the transmission, transportation, storage, and conversion of energy. Examples of such are research and development undertaken primarily to reduce fuel consumption in manufacturing, to improve the efficiency of transportation of energy products, or to produce an end product which is more efficient in energy consumption.

Item 6D — "All Other Energy" includes areas such as wind, waste, hydroelectric, etc. Also include in this category the development of energy equipment which cannot be readily classified in Items 6A to 6C. In a limited number of cases, the separation of joint (multiple) costs by type of energy may not be feasible. In this circumstance, include here the total project cost if the **primary** purpose of a project is energy research and development.

Item 6F — Pollution Abatement Research and Development — Include R&D spending for the purpose of reducing or eliminating the emission of pollutants. "Pollution" refers to the emission of pollutants to the outside of a firm's (or household's) property or activities; "abatement" includes prevention, treatment or recycling. Exclude spending to contribute to environmental aesthetics, to increase equipment durability in corrosive environments, to conserve energy (include as energy research and development in Item 6C) and natural resources, or to increase employee comfort, safety, and health.

If the purpose of the R&D project is pollution abatement only, include the total expenditures on the R&D project. If the project has mixed purposes, estimate and report where possible only the portion of costs incurred for the pollution abatement purpose. If a separation of joint costs cannot be made, then decide whether the R&D project is primarily (more than 50 percent) for pollution abatement. If so, then include the total cost of the project. If the project **is not** primarily for pollution abatement, then exclude all of the project cost. Exclude project costs if expected pollution abatement benefits are incidental. (Incidental benefits are those obtained at no extra cost.)

Item 7 — Total Company Funds Spent for Research and Development Activities Performed by Foreign Subisiaries Outside the United States — Report the amount of research and development that was performed in company R&D laboratories, branch plants, and divisions located outside the United States and was **financed by the U.S. parent or its foreign subsidiaries;** exclude the R&D activities performed in foreign subsidiaries that were financed by foreign governments or other outside organizations. NOTE: Foreign subsidiaries are those outside the 50 States or the District of Columbia.

Additional forms — Photocopies of this form are acceptable. If you require additional copies of the form, write to the Census Bureau, 1201 East Tenth Street, Jeffersonville, Indiana 47132.

DUE DATE: 60 DAYS AFTER RECEIPT OF FORM

OMB No. 3145-0027: Approval Expires July 31, 1987

FORM **RD-1**
(8 14 84)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
COLLECTING AND COMPILING AGENT FOR
THE NATIONAL SCIENCE FOUNDATION

SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1984

RETURN TO
Bureau of the Census
1201 East Tenth Street
Jeffersonville, Indiana 47132

NOTICE – Your report to the Census Bureau is **confidential** by law (title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are **immune from legal process.**

Name of person who supplied 1983 data

Item 1 – NAME AND ADDRESS OF COMPANY *(Please correct any error in name and address, including ZIP code)*

Group	Survey
4	4001

NOTE: Data supplied in items 2A and 2B and in item 5C, columns 2 and 4, for 1984 on this form, will satisfy the **mandatory** reporting requirement of Census Form MA-121 (title 13, U.S. Code). Although you are not required to complete the other items, your cooperation on these voluntary items is essential to make the results of this survey comprehensive, accurate, and timely.

YOUR FILE COPY

GENERAL INSTRUCTIONS

- Please complete this form and return within 60 days in the envelope provided. Retain the file copy for your records. THIS REPORT SHOULD COVER YOUR ENTIRE COMPANY, INCLUDING ALL SUBSIDIARIES AND AFFILIATES, UNLESS OTHERWISE DESIGNATED.
- Enter "None" where appropriate rather than leaving a blank space.
- Reasonably accurate estimates are acceptable.
- Figures for 1983 are those reported by your company last year. The 1983 figures should be revised, if necessary, to be comparable with 1984 data.
- Explain in "Remarks" on the back page any substantial increases or decreases in 1984 figures over 1983 (e.g., new government contracts, acquisitions, mergers, divestitures, etc.)

PLEASE READ ENCLOSED INSTRUCTIONS BEFORE COMPLETING THIS FORM

Section I – GENERAL COMPANY DATA

Item 2 – DOMESTIC SALES, RECEIPTS, AND EMPLOYMENT FOR COMPANY	CT1		1984 [2]
A. Domestic net sales and receipts of this company *(Thousands of dollars)*	2001		$
B. Total domestic company employment in all activities during the pay period which includes the 12th of March 1983 and 1984	2002		

Item 3 – RESEARCH AND DEVELOPMENT EXPENDITURES

Are research and development expenditures for entire domestic company, including subsidiaries and affiliates, reported on this form? ☐ YES ☐ NO – *Please explain in remarks or on transmittal letter.*

Section II – RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY IN THE UNITED STATES

(Exclude R&D financed by the company but performed by others. Report such R&D in section III.)

Item 4 – NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS Apportion on a full-time equivalent basis *(See Instruction Manual, page 2)*	CT2		January 1985 [2]
TOTAL →	3099		

Item 5 – COST OR RECEIPTS FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY MAJOR TYPE AND SOURCE OF FUNDS (Include depreciation and overhead; exclude R&D capital expenditures) *(See instruction manual.)*

	CT2	*Thousands of dollars* 1983 TOTAL research and development [1]	1984 Federal funds [2]	1984 Company and other funds, except Federal [3]	1984 TOTAL *(Sum of columns 2 and 3)* [4]
A. Basic research *If "None," please mark* ☐ 35105	3510		$	$	$
B. Applied research and development – 1. Applied research	3521				
2. Development	3522				
3. **TOTAL** *(Sum of lines 1 and 2)*	3529				
C. TOTALS *(Sum of A and B3)* →	3599				
D. 1983 TOTALS →	3598				

	CT1	[1]
E. Company and other funds, except Federal, budgeted for the year 1985 →	3800	$

Item 6 – RESEARCH AND DEVELOPMENT BY FUNCTIONAL CATEGORY (Of the total reported in Item 5C, COST OR RECEIPTS FOR RESEARCH AND DEVELOPMENT, *columns 2 and 4, report the following functional categories.)*

ENERGY RESEARCH AND DEVELOPMENT Included the project cost or portion of project cost incurred for the purpose of increasing energy resources or capabilities. Include cost by type of energy. *If "None," please mark (x)* ☐ 80996	CT2		*Thousands of dollars* 1984 Federal funds [3]	1984 Total funds [4]	1985 Total projected costs [5]
A. Total nuclear	8010		$	$	$
B. Total fossil fuels	8020				
C. Total geothermal, solar, and conservation and utilization	8030				
D. All other energy	8060				
E. TOTAL of A through D →	8099		$	$	$

POLLUTION ABATEMENT RESEARCH AND DEVELOPMENT – Include the project cost or portion of the project cost incurred for the purpose of designing pollution abatement products or product characterisitics or of designing pollution abatement features into processes. *If "None," please mark (x)* ☐ 81996	CT2		*Thousands of dollars* 1984 Federal funds [3]	1984 Total funds [4]	1985 Total projected costs [5]
TOTAL →	8199		$	$	$

Section III – RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE DOMESTIC COMPANY

Not included in item 5 with company funds

Item 7 – TOTAL COMPANY FUNDS SPENT FOR RESEARCH AND DEVELOPMENT ACTIVITIES PERFORMED BY FOREIGN AFFILIATES OUTSIDE THE UNITED STATES *If "None," please mark (x)* ☐ 11603	CT2		*Thousands of dollars* 1984 [2]
	1160		$

Item 8 — STATUS OF THIS COMPANY ON DECEMBER 31, 1984

A. Was the company listed in Item 1 owned or controlled by another company on December 31, 1984? ☐ Yes — *Complete item 8B* ☐ No

B. New owner information

Name			Date acquired
Address *(Number and street)*			Federal Social Security Employer Identification Number, if available
City	State	ZIP code	

REMARKS

Name of person to contact regarding this report	Address *(No. and street, city, State, ZIP code)*	Telephone Area code	Number	Extension
Period covered by this report ☐ Calendar year ☐ Fiscal year — *Specify* →	From — *Month/day/year*	To — *Month/day/year*		

CERTIFICATION — This report is substantially accurate and has been prepared in accordance with instructions.

Name of company	Address *(No. and street, city, State, ZIP code)*	
Signature of authorized official	Title	Date

science and technology inputs and outputs

national survey of academic research instruments and instrumentation needs

purpose and background

The objective of this survey is to obtain nationally representative information on research equipment in higher education institutions. The survey produces reliable quantitative indicators of the current status and trends in the need, stock, cost, and utilization of academic research instruments, as well as data on the status of their condition and degree of obsolescence.

survey instrument

Two survey instruments are utilized for data collection: A Departmental Questionnaire collects generalized information from chairpersons on the research-related characteristics and equipment priorities of their organizations (i.e., research budgets, number of researchers, maintenance expenditures, primary research equipment, items needed, etc.); an Instrument Data Sheet, completed by individual investigators, collects data on the status, cost, condition, and utilization of particular equipment items in the investigator's charge.

survey design

The study is based on a stratified probability sample survey of 55 universities selected from a universe of approximately 160 of the largest academic performers of research and development. The most recent 1985-86 survey collects information on the characteristics of equipment costing between $10,000 and $1,000,000 that has been added to the inventory since the 1982-83 academic year.

The survey is conducted in two phases: In the first phase, data are collected from a subsample of departments in the computer and physical sciences and engineering. In the second phase, data are gathered from a subsample of departments in the biological, agricultural, and environmental sciences. In addition, as part of the second phase, data on biomedical science research equipment located in medical schools are collected. These latter data are of particular interest to the National Institutes of Health (NIH), a co-sponsor of this project.

data availability

The 1985-86 survey is designed to update the baseline instrumentation study which was conducted for the 1982-83 academic year. The format, design, and information content of both surveys are essentially the same.

data access

Microdata from this survey are not available in the form of public-use tapes or diskettes due to the confidentiality of institutional, departmental, and investigator data. Information is available only in the form of analytical reports that contain summary tabulations of survey data.

The analytical report and statistical tables for the first phase of the 1985-86 instrumentation survey are scheduled to become available in summer 1987; a comprehensive analytical report and statistical tables covering all science/engineering fields surveyed in both phases of the project are anticipated in summer 1988.

The 1982-83 baseline survey results are available, upon request from Mrs. Elizabeth Michael, Office of Division Director, Division of Science Resources Studies, in the published report, *Academic Research Equipment in Selected Science/Engineering Fields, 1982-83*, National Science Foundation, 1985. Inquiries should be directed to:

Mr. James B. Hoehn
Division of Science Resources
Studies
Universities and Colleges
Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L602
Washington, D.C. 20550
(202) 634-4673

Form
Number:

OMB No. 3145-0067
Expiration Date 2/28/89

NATIONAL SURVEY OF ACADEMIC RESEARCH INSTRUMENTS AND INSTRUMENTATION NEEDS II

NATIONAL SCIENCE FOUNDATION

DEPARTMENT/FACILITY QUESTIONNAIRE

THIS REPORT IS AUTHORIZED BY LAW (P.L. 96-44). WHILE YOU ARE NOT REQUIRED TO RESPOND, YOUR COOPERATION IS NEEDED TO MAKE THE RESULTS OF THIS SURVEY COMPREHENSIVE, ACCURATE, AND TIMELY. INFORMATION GATHERED IN THIS SURVEY WILL BE USED ONLY FOR DEVELOPING STATISTICAL SUMMARIES. INDIVIDUAL PERSONS, INSTITUTIONS, AND DEPARTMENTS WILL NOT BE IDENTIFIED IN PUBLISHED SUMMARIES OF THE DATA.

BACKGROUND AND INSTRUCTIONS

There is widespread concern about whether academic research scientists and engineers have sufficient access to the kinds of equipment needed to permit continuing research at the frontier of scientific knowledge. To help the National Science Foundation and other Federal agencies set appropriate equipment funding levels and priorities, this congressionally-mandated survey is intended to update findings for a similar study undertaken in 1982-83 and to document trends in (a) the amount, cost, and condition of the scientific research equipment currently available in the nation's principal research universities, and (b) the nature and extent of the need for upgraded or expanded equipment in the major fields of science and engineering.

The update survey is being conducted in two phases. The current phase (Phase I) deals with research equipment in the physical sciences, engineering, and computer sciences. Next year, Phase II will be concerned with the agricultural, biological, and environmental sciences.

This Department Questionnaire seeks a broad overview of equipment-related expenditures and needs in this department (or nondepartmental research facility). Items 1-10 (Parts A and B) are factual in nature and may be delegated to any person or persons who can provide the requested data. In these sections, informed estimates are acceptable whenever precise information is not available from annual reports or other data sources. Items 11-16 (Part C) call for judgmental assessments about equipment-related research needs and priorities of the department (or facility) as a whole and should be answered by the department chairperson (or facility director) or by a designee who is in a position to make such judgments. We urge that particular attention be given to Item 15, which asks for this department's (or facility's) recommendations about needed changes in equipment funding policies and procedures.

This form should be returned to your institution's study coordinator. Your cooperation in returning the survey form promptly is very important.

PART A. DESCRIPTIVE INFORMATION

1. Institution name. ______________________________

2. Department (or nondepartmental research facility) name:

____

3. This is: (CHECK ONE)

☐ 1 An academic department (CONTINUE WITH ITEM 4)

☐ 2 A nondepartmental research facility (SKIP TO ITEM 7)

4. Number of doctoral degrees awarded in the 1984-85 academic year to students in this department:

____

5. Number of full-time faculty members in this department: __________

6. Number of full-time faculty members in this department who are participating in ongoing research projects:

____

PART B. RESEARCH-RELATED FUNDING AND EXPENDITURES

7. Department (or facility) expenditures for scientific research equipment during the institution's 1985 fiscal year.

$__________ FY 1985 expenditures for scientific research equipment

NOTE: SCIENTIFIC EQUIPMENT IS ANY ITEM (OR INTERRELATED COLLECTION OF ITEMS COMPRISING A SYSTEM) OF NONEXPENDABLE TANGIBLE PROPERTY OR SOFTWARE, HAVING A USEFUL LIFE OF MORE THAN TWO YEARS AND AN ACQUISITION COST OF $500 OR MORE, WHICH IS USED WHOLLY OR IN PART FOR RESEARCH. INCLUDE ALL SCIENTIFIC RESEARCH EQUIPMENT ACQUIRED FROM ALL SOURCES -- FEDERAL, STATE, INSTITUTIONAL, INDUSTRIAL, ETC.

8. Please provide an approximate breakdown by source of funds for this department's (or facility's) FY 1985 expenditures for scientific research equipment. [NOTE: ENTRIES SHOULD SUM TO 100 PERCENT; ESTIMATES ARE ACCEPTABLE.]

Source of funds	Percent of FY 1985 expenditures for scientific research equipment
a. Federal Government	____________%
b. Internal institution funds	____________%
c. State equipment or capital development appropriations	____________%
d. Private nonprofit foundations/ organizations	____________%
e. Business or industry	____________%
f. Other (SPECIFY) ______________ ____________________	____________%
TOTAL, ALL FUNDING SOURCES	____100____%

9. FY 1985 expenditures for purchase of research-related computer services at:

$_______ Institution computing facilities

$_______ Other computing facilities

10. FY 1985 expenditures for maintenance and repair of all scientific research equipment in this department (or facility):

$_______ Service contracts or field service for maintenance and repair of individual instruments

$_______ Salaries of institution maintenance/repair personnel (pro-rate if personnel do not work full-time in this department/facility or on servicing of research equipment)

$_______ Other direct costs of supplies, equipment and facilities for servicing of research instruments in this department/facility

$_______ Total

PART C. ADEQUACY OF AND NEED FOR SCIENTIFIC RESEARCH EQUIPMENT

11. Are the instrumentation support services (e.g., machine shop, electronics shops) at this department or facility: (CHECK ONE)

☐ 1 Excellent
☐ 2 Adequate
☐ 3 Insufficient
☐ 4 Nonexistent

12. In terms of its capability to enable faculty investigators to pursue their major research interests, is the research equipment in this department (or facility) generally:

☐ 1 Excellent
☐ 2 Adequate
☐ 3 Insufficient

13. If greater Federal funding of research equipment were possible, in which single area would increased investment be most beneficial to investigators in this department/facility? (CHECK ONE)

☐ 1 Large scale regional and national instrumentation facilities
☐ 2 Major shared access instrument systems ($50,000-$1,000,000) not presently available to department/facility members
☐ 3 Upgrading/expansion of equipment in $10,000-$50,000 range
☐ 4 General enhancement of equipment and supplies in labels of individual P.I.'s (items generally below $10,000)
☐ 5 Other (SPECIFY) ____________________

14. What three items of research equipment in the $10,000-$1,000,000 cost range are the topmost priorities at this time in this department/facility? (Please list in priority order beginning with priority no. 1.)

	Item description	Approximate cost
1.		
2.		
3.		

15. How could current Federal equipment funding policies and/or procedures be modified to better meet the research needs of researchers in this department/facility?

16. Please note in the space below: (a) any additional information needed to describe the research equipment and equipment-related needs in this department/facility, or (b) any suggestions to improve this survey questionnaire.

17. Person who prepared this submission:

NAME AND TITLE

AREA CODE - EXCH - NO - EXT

18. How many person-hours were required to complete this form?

HOURS

MINUTES

OMB No. 3145-0067
Expiration Date 2/28/89

NATIONAL SURVEY OF ACADEMIC RESEARCH INSTRUMENTS AND INSTRUMENTATION NEEDS II

NATIONAL SCIENCE FOUNDATION INSTRUMENT DATA SHEET

This data sheet is part of a major national assessment of the condition of academic research instrumentation. The data sheet concerns a particular instrument selected from university central inventory records as part of a national sample of research instruments in your field. The sampled item is described below.

We ask that the requested information be obtained from the research investigator or person(s) who is most knowledgeable about the history and current status of this instrument. Where exact cost (or other) data are not available, estimates are acceptable. Your estimates will be better than ours.

This study is authorized by law (P.L. 96-44). While you are not required to respond, your cooperation is needed to make the results of this survey comprehensive, accurate, and timely. Information gathered in this survey will be used only for developing statistical summaries. Individual persons, institutions, and departments will not be identified in published summaries of the data.

Your cooperation in returning the survey form promptly is very important. Please direct any questions about this form to your university study coordinator.

DEFINITION OF KEY TERMS

INSTRUMENT PURCHASE PRICE (initial value)

The original price of the instrument (or its components, if built locally) at time of original purchase from the manufacturer. Do not include cost of separately purchased accessories; do not subtract any discount (e.g., for trade-in) which may have been received. Please estimate if original records are not available.

YEAR OF PURCHASE

The calendar year when this instrument (or its principal components) was originally purchased from the manufacturer.

DEDICATED ACCESSORIES

Separately acquired "add-ons" to or components of the instrumentation system of which the instrument described below is the principal element. This includes accessories that are presently dedicated solely for use with the referenced instrument but are not included in its purchase cost (in item G, below). Examples: specimen preparation and photographic accessories for a particular electron microscope; oscilloscope, microprocessor, HPLC, or data system accessories for a particular spectrometer; key entry, disc drive, printer or plotter accessories for a particular microcomputer.

INSTRUMENT DATA: PLEASE REVIEW AND CORRECT AS NEEDED

	CORRECTIONS
A. SURVEY FORM NUMBER:	
B. Department or Facility:	
C. Instrument:	____________
D. Central Records ID:	____________
E. Location:	____________
F. Year of Purchase:	____________
G. Instrument Purchase Price:	____________

SEE PAGE 1 FOR DEFINITION OF ALL BOLDFACE TERMS

1. What was this instrument's status during 1985? (CHECK ONE)

   ☐ 1 Used in original scientific research (CONTINUE TO ITEM 2)

   ☐ 2 Used only for nonresearch purposes (SKIP TO ITEM 15)

   ☐ 3 Inactive or inoperable throughout 1985 (SKIP TO ITEM 15)

   ☐ 4 No longer exists (cannibalized, junked, traded in, or otherwise disposed of) (SKIP TO ITEM 15)

   ☐ 5 Not yet in service (SKIP TO ITEM 15)

   ☐ 6 Other (SPECIFY) ____

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2. Where was this instrument located during 1985 when in research use? (CHECK ONE)

   ☐ 1 National, regional, or interuniversity research instrumentation lab (CONTINUE TO ITEM 3)

   ☐ 2 Nondepartmental research facility (CONTINUE TO ITEM 3)

   ☐ 3 Department-managed common lab or research instrumentation facility (CONTINUE TO ITEM 3)

   ☐ 4 Within-department research lab of principal investigator (CONTINUE TO ITEM 3)

   ☐ 5 Lab or facility used almost exclusively for undergraduate instruction, or for other nonresearch activity (SKIP TO ITEM 15)

   ☐ 6 Other (SPECIFY)____

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3. Does this instrument have any **DEDICATED ACCESSORIES** not included in the **INSTRUMENT PURCHASE PRICE** (from ID BOX, item G)? (See page 1 definitions of key terms)

   ☐ 1 Yes → 3a. Estimated aggregate purchase of all **DEDICATED ACCESSORIES** not included in ID BOX item G. $__________

   ☐ 2 No

   3b. Please describe and estimate the purchase price for each separately purchased **DEDICATED ACCESSORY** costing $10,000 or more. (If additional space is needed, continue in Question 15 or attach a separate continuation sheet.)

Description of accessories $10,000 or more	Purchase cost
1.________________________________	$__________
2.________________________________	$__________
3.________________________________	$__________
4.________________________________	$__________

---

4. What was the instrument's principal field of research use in 1985? (e.g., physics, astronomy, chemistry, computer science, electrical engineering)

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5. How was this instrument acquired at this institution? (CHECK ONE)

- ☐ 1 Purchased new
- ☐ 2 Purchased used
- ☐ 3 Locally built (at or for this institution)
- ☐ 4 Transferred from another institution, e.g., by incoming faculty member (SKIP TO ITEM 7)
- ☐ 5 Government surplus (SKIP TO ITEM 7)
- ☐ 6 Donated new (SKIP TO ITEM 7)
- ☐ 7 Donated used (SKIP TO ITEM 7)
- ☐ 8 Other (SPECIFY): ____________________

____

6. Source(s) of funds for acquisition of this instrument at this institution. (SPECIFY APPROXIMATE PERCENTAGE CONTRIBUTION FOR EACH APPLICABLE SOURCE.)

Funding contribution (percent)	Funding source
	Federal sources:
______	NSF (National Science Foundation)
______	NIH (National Institutes of Health)
______	DOD (Department of Defense)
______	DOE (Department of Energy)
______	USDA (Department of Agriculture)
______	Other Federal sources (SPECIFY): ____________________
	Non-Federal sources:
______	Institution or department funds
______	State grant or appropriation
______	Private nonprofit foundation
______	Business or industry
______	Other (SPECIFY): ____________________
100%	Total

7. How much was spent for maintenance and repair (not for operation) of this instrument and its accessories in 1985?

$________

8. Means of servicing (maintenance/repair) this instrument during 1985: (CHECK ALL THAT APPLY)

- ☐ 1 None required
- ☐ 2 Service contract
- ☐ 3 Field service, as needed
- ☐ 4 Institution-employed maintenance/repair staff
- ☐ 5 Research personnel (faculty, students, post-docs)
- ☐ 6 Other (SPECIFY): ____________

9. Adequacy of the servicing (maintenance/repair) this instrument received during 1985: (CHECK ONE)

- ☐ 1 Not applicable: no servicing was needed
- ☐ 2 Excellent
- ☐ 3 Adequate
- ☐ 4 Inadequate

10. Instrument's general working condition during 1985: (CHECK ONE)

- ☐ 1 Excellent
- ☐ 2 Average
- ☐ 3 Poor (e.g., unreliable, frequent breakdowns, difficult to maintain or service)
- ☐ 4 Inoperable entire year

11. Research function of this instrument during 1985: (CHECK ONE)

- ☐ 1 Most advanced instrument of its kind that is accessible to those who use it in their research
- ☐ 2 Used for research; more advanced instruments are available to users when needed
- ☐ 3 Not used for research during 1985

12. Technical capabilities of this instrument (i.e., the base instrument, excluding accessories) (CHECK ONE)

☐ 1 State-of-the-art (most highly developed and scientifically sophisticated instrument of its kind)

☐ 2 Adequate to meet researcher needs

☐ 3 Inadequate for research (PLEASE EXPLAIN): ____________________

13. In 1985, was this a general purpose instrument within an area of research or was it dedicated for a particular experiment or series of experiments? (CHECK ONE)

☐ 1 General purpose

☐ 2 Dedicated

14. How many research investigators made use of this instrument for research purposes during 1985: (ESTIMATE APPROXIMATE NUMBER IN EACH APPLICABLE CATEGORY)

_____ 1 Faculty and equivalent nonfaculty researchers, this department/facility

_____ 2 Graduate and medical students and postdoctorates, this department/facility

_____ 3 Faculty and equivalent nonfaculty researchers, other departments, this university

_____ 4 Graduate and medical students and postdoctorates, other departments, this university

_____ 5 Researchers from other universities

_____ 6 Nonacademic researchers

_____ 7 Other (SPECIFY): ____________________

_____ Total number of research users

15. Please note in space below: (a) Any additional information needed to clarify the nature, function and quality of this instrument, or (b) any suggestions to improve this questionnaire or its instructions.

16. Person who prepared this submission:

____________________ NAME AND TITLE

____________________ AREA CODE - EXCH - NO - EXT

17. How many person-hours were required to complete this form?

_____ HOURS _____ MINUTES

OMB No. 3145-0067
Expiration Date 2/28/89

NATIONAL SURVEY OF ACADEMIC RESEARCH INSTRUMENTS AND INSTRUMENTATION NEEDS II

NATIONAL SCIENCE FOUNDATION
INSTRUMENT DATA SHEET: UPDATE

The instrument or component shown below was part of a major national assessment of the condition of academic research instrumentation in 1982. Certain elements relating to the instrument's status, condition, and usage need updating as of 1985.

Identifying data for the instrument and some of the information about its cost, acquisition, and configuration that was obtained in 1982 are reproduced below in the space provided. Please review these data and make any necessary changes. Then please complete the form by answering questions 1 through 13. See back page for definitions of key terms .

We ask that the requested information be obtained from the research investigator or person(s) who is most knowledgeable about the history and current status of the instrument. Where exact cost (or other) data are not available, estimates are acceptable. Your estimates will be better than ours.

This study is authorized by law (P.L. 96-44). While you are not required to respond, your cooperation is needed to make the results of this survey comprehensive, accurate, and timely. Information gathered in this survey will be used only for developing statistical summaries. Individual persons, institutions, and departments will not be identified in published summaries of the data.

Your cooperation in returning the survey form promptly is very important. Please direct any questions about this form to your university study coordinator.

INSTRUMENT DATA: PLEASE REVIEW AND CORRECT AS NEEDED

SURVEY FORM NUMBER:

CORRECTIONS

A. Department or Facility:
B. Preparer of 1982 Survey Form:
C. Instrument: ____________________
D. Central Records ID: ____________________
E. Location: ____________________
F. Year of Purchase: ____________________
G. Instrument Purchase Price: ____________________
H. Means of Acquisition at this University: ____________________
I. Source of Funds for Acquisition at this University: ____________________
J. Does Instrument have any Dedicated Accessories NOT included in Instrument Purchase Price: ____________________
K. Aggregate Purchase Price of all dedicated Accessories NOT included in Instrument Purchase Price: ____________________
L. Cost and Description of Separately Purchased Dedicated Accessories Costing $10,000+ (Please indicate additions/deletions since 1982):

1. What was this instrument's status during 1985? (CHECK ONE)

☐ 1 Used in original scientific research (CONTINUE TO ITEM 2)
☐ 2 Used only for nonresearch purposes (SKIP TO ITEM ~~11~~)/12
☐ 3 Inactive or inoperable throughout 1985 (SKIP TO ITEM ~~11~~) /12
☐ 4 No longer exists (cannibalized, junked, traded in, or otherwise disposed of) (SKIP TO ITEM ~~11~~)/12
☐ 5 Not yet in service (SKIP TO ITEM ~~11~~) /12
☐ 6 Other (SPECIFY) ______________________________

2. Where was this instrument located during 1985 when in research use? (CHECK ONE)

☐ 1 National, regional, or interuniversity research instrumentation lab (CONTINUE TO ITEM 3)
☐ 2 Nondepartmental research facility (CONTINUE TO ITEM 3)
☐ 3 Department-managed common lab or research instrumentation facility (CONTINUE TO ITEM 3)
☐ 4 Within-department research lab of principal investigator (CONTINUE TO ITEM 3)
☐ 5 Lab or facility used almost exclusively for undergraduate instruction, or for other nonresearch activity (SKIP TO ITEM 11)
☐ 6 Other (SPECIFY)______________________________

3. What was the instrument's principal field of research use in 1985? (e.g., physics, astronomy, chemistry, computer science, electrical engineering)

____

4. How much was spent for maintenance and repair (not for operation) of this instrument and its accessories in 1985?

$__________

5. Means of servicing (maintenance/repair) this instrument during 1985: (CHECK ALL THAT APPLY)

☐ 1 None required
☐ 2 Service contract
☐ 3 Field service, as needed
☐ 4 Institution-employed maintenance/repair staff
☐ 5 Research personnel (faculty, students, post-docs)
☐ 6 Other (SPECIFY):______________

6. Adequacy of the servicing (maintenance/repair) this instrument received during 1985: (CHECK ONE)

☐ 1 Not applicable: no servicing was needed
☐ 2 Excellent
☐ 3 Adequate
☐ 4 Inadequate

7. Instrument's general working condition during 1985: (CHECK ONE)

☐ 1 Excellent
☐ 2 Average
☐ 3 Poor (e.g., unreliable, frequent breakdowns, difficult to maintain or service)
☐ 4 Inoperable entire year

8. Research function of this instrument during 1985: (CHECK ONE)

☐ 1 Most advanced instrument of its kind that is accessible to those who use it in their research

☐ 2 Used for research; more advanced instruments are available to users when needed

☐ 3 Not used for research during 1985

9. Technical capabilities of this instrument (i.e., the base instrument, excluding accessories) (CHECK ONE)

☐ 1 State-of-the-art (most highly developed and scientifically sophisticated instrument of its kind)

☐ 2 Adequate to meet researcher needs

☐ 3 Inadequate for research (PLEASE EXPLAIN): ____________________

10. In 1985, was this a general purpose instrument within an area of research or was it dedicated for a particular experiment or series of experiments? (CHECK ONE)

☐ 1 General purpose

☐ 2 Dedicated

11. How many research investigators made use of this instrument for research purposes during 1985: (ESTIMATE APPROXIMATE NUMBER IN EACH APPLICABLE CATEGORY)

_____ 1 Faculty and equivalent nonfaculty researchers, this department/facility
_____ 2 Graduate and medical students and postdoctorates, this department/facility
_____ 3 Faculty and equivalent nonfaculty researchers, other departments, this university
_____ 4 Graduate and medical students and postdoctorates, other departments, this university
_____ 5 Researchers from other universities
_____ 6 Nonacademic researchers
_____ 7 Other (SPECIFY): ____________________
_____ Total number of research users

12. Please note in space below: (a) Any additional information needed to clarify the nature, function and quality of this instrument, or (b) any suggestions to improve this questionnaire or its instructions.

13. Person who prepared this submission:

____________________ NAME AND TITLE
____________________ AREA CODE - EXCH - NO - EXT

14. How many person-hours were required to complete this form?

_____ HOURS _____ MINUTES

DEFINITION OF KEY TERMS

INSTRUMENT PURCHASE PRICE (initial value)

The original price of the instrument (or its components, if built locally) at time of original purchase from the manufacturer. Do not include cost of separately purchased accessories; do not subtract any discount (e.g., for trade-in) which may have been received. Please estimate if original records are not available.

YEAR OF PURCHASE

The calendar year when this instrument (or its principal components) was originally purchased from the manufacturer.

DEDICATED ACCESSORIES

Separately acquired "add-ons" to or components of the instrumentation system of which the instrument described below is the principal element. This includes accessories that are presently dedicated solely for use with the reference instrument but are not included in its purchase price (in item G, page 1). Examples: specimen preparation and photographic accessories for a particular electron microscope; oscilloscope, microprocessor, HPLC, or data system accessories for a particular spectrometer; key entry, disc drive, printer or plotter accessories for a particular microcomputer.

public attitudes towards science and technology

purpose and background

This survey is sponsored regularly by the National Science Foundation (NSF) to ascertain the attitudes of the U.S. adult public on a broad range of science and technology (S/T) issues. Results are used in the National Science Board's biennial *Science and Engineering Indicators* reports and thereby provide the Administration, the Congress, and NSF management information about the degree of public science literacy, public acceptance of science and technology, and related expectations and concerns. Findings are widely circulated in the press as well. Besides the broad public, specialized groups are surveyed. Such groups have included college students, "attentives" (i.e., individuals knowledgeable about and interested in science and technology), and policy leaders outside the Government. The survey is conducted approximately every two years.

survey instrument

Survey content varies although certain core items are retained over time. A copy of the questionnaire for the latest November-December 1985 survey follows. The subjects covered by the survey are diverse, but can generally be classified under the following headings: Public knowledge and interest regarding science and technology; personal activities regarding science and technology; acceptance and admiration of science and technology; perceived effects of science and technology; and, attitudes on S/T policy areas. These latter include public spending for pure research, regulation of research, genetic engineering, the space program, nuclear power, and science education. Past studies have covered topics such as chemical food additives, computers, and the relationship of automation and employment.

A special 1986 study, based primarily on reinterviews of the 1985 sample, is aimed at determining public reaction to the technological accidents surrounding the Challenger space shuttle and the Chernobyl U.S.S.R. nuclear power plant as they affect attitudes toward the U.S. space program, nuclear power, and science and technology in general.

In addition to substantive questions, the survey contains a set of auxiliary questions to ascertain whether the respondent can be classified as "attentive" to science and technology. Other questions measure the respondent's sense of political efficacy and the extent of political and social participation. Data on the demographic characteristics (age, race, sex, education, marital status, and number of children) of the respondent are also collected.

survey design

The most recent public attitude surveys were conducted by telephone. The 1985 survey was based on a national probability sample following a two-stage cluster sample of 150 primary sampling units (PSU's). (The design closely follows the work of Sudman and Kish.) Thirty-three of the PSU's are self-weighting and represent the 33 largest U.S. metropolitan areas. The remaining 117 PSU's are smaller metropolitan areas or counties, each selected with a probability proportionate to their size.

Within each household, one individual aged 18 or over is selected randomly. The person answering the telephone is asked to indicate the number of adults over age 18 who regularly live in that household as well as information on the ages of each household member from oldest to youngest. The Computer-Aided Telephone Interview (CATI) software randomly selects one of the ages, identifying that person as the respondent. This design ensures that every individual in a household with a working telephone has an equal probability of selection for survey participation.

In the 1985 study, 2,005 interviews were completed. In total, 503 individuals refused to participate, resulting in an 80-percent response rate. Descriptions of conversations with individuals refusing to participate were recorded. Sample replacements of individuals in the PSU's were then selected by the CATI software.

data availability

The 1981, 1985, and 1986 telephone surveys were conducted by the Opinion Research Laboratory, Northern Illinois University. In the latter two years, the underlying survey population covered the entire adult public. The 1986 survey was intended as a reinterview of the 1985 sample to assess changes in attitude to the space shuttle program and nuclear power given the accidents related to the Challenger space shuttle and the Chernobyl, U.S.S.R. nuclear reactor. The 1981 survey was targeted to "attentives" and policy leaders outside of Government.

Relatively brief surveys were performed in 1972, 1974, and 1976 by Opinion Research, Inc. These surveys were based on personal interviews performed as part of a multiple-sponsored, multipurposed "caravan" survey. Questionnaire content was nearly constant throughout these years. In 1979, the National Opinion Research Center of Temple University completely redesigned the survey into a national personal-interview survey entirely devoted to the subject of public attitudes in science and technology.

data access

Data tapes from the 1981 and 1985 surveys, as well as a single diskette containing 1985 survey data can be obtained from:

Dr. Jon D. Miller
Public Opinion Laboratory
Social Science Research Institute
Northern Illinois University
DeKalb, Illinois 60115
(815) 753-1901

Reports from the 1979 survey can be obtained from the National Technical Information Service (NTIS) in hard-copy or microfiche under numbers PB-81155079 (questionnaire design), PB-81161317 (data and method of collection), and PB-82157512 (analytic report); the data tape may be ordered under the number PB-81208134. Hard-copy or microfiche reports of the 1977, 1974, and 1976 surveys can be obtained from NTIS using order numbers PB-261815/AS, PB-262029/AS, and PB-287200/AS, respectively. Magnetic tapes of these data are available under order numbers PB-275361/AS, PB-275363/AS, and PB-287718/AS.

Additional inquiries should be directed to:

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Interview Schedule for the 1985 Survey of Public Attitudes toward Science and Technology

A Report to the National Science Foundation

Jon D. Miller
Northern Illinois University

November 20, 1985

THE INTERVIEW SCHEDULE

Hello, my name is __________ and I am calling long-distance from the Public Opinion Laboratory. We are conducting a national survey of people's opinions about current issues in the news and your telephone number has been selected. Have you ever been interviewed for a national opinion survey before?

If yes or no: As you may know, we are a university-based group and we have no products to sell. We are interested in your opinions on a number of current topics and we will treat your answers with strict confidence.

In order to select a representative cross-section of people, I need to talk to just one person who lives at this number and I need your help in selecting that person. How many adults 18 years of age or older regularly live in your home?

Can you tell me the age of each person in your household from oldest to youngest?

Now, according to our selection procedure, I need to speak with the _____ year old. What is that person's first name? May I speak to (name)?

Repeat introductory remarks if new person is interviewed.

Interviewer will code gender, asking directly only if necessary.

Q1. Let me start by asking how interested you are in current news events. Would you say that you are very interested (1), moderately interested (2), or not at all interested (3) in current news events?

Q2. There are a lot of issues in the news and it is hard to keep up with every area. I am going to read you a short list of issues and for each one -- as I read it -- I would like for you to tell me if you are very interested, moderately interested, or not at all interested in that particular issue.

Q2a. International and foreign policy issues. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2b. Agricultural and farm issues. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2c. Local school issues. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2d. Issues about new scientific discoveries. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2e. Economic issues and business conditions. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2f. Issues about the use of new inventions and technologies. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2g. Women's rights issues. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2h. Issues about energy policy. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2i. Issues about space exploration. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2j. Issues about new medical discoveries. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q2k. Issues about military and defense policy. Are you very interested (1), moderately interested (2), or not at all interested (3)?

Q3. Now, I'd like to go through this list with you again and for each issue I'd like for you to tell me if you are very well informed about that issue, moderately well informed, or poorly informed.

Q3a. International and foreign policy issues. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3b. Agricultural and farm issues. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3c. Local school issues. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3d. Issues about new scientific discoveries. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3e. Economic issues and business conditions. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3f. Issues about the use of new inventions and technologies. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3g. Women's rights issues. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3h. Issues about energy policy. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3i. Issues about space exploration. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3j. Issues about new medical discoveries. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q3k. Issues about military and defense policy. Would you say that you are very well informed (1), moderately well informed (2), or poorly informed (3)?

Q4. We are interested in how people get information about events in the news. Let me ask you a few questions about the places and ways that you find out about issues. Thinking about the kind of issue information we have been talking about, do you get most of your information about current news events from radio (1), from television (2), from newspapers (3), from news magazines (4), from books (5), or from talking to other people (6)?

Q5. How often do you read a newspaper: every day (1), a few times a week (2), once a week (3), or less than once a week (4)?

Q6. Are there any magazines that you read regularly, that is, most of the time? (Probe for up to 5)

Q7. Are there any other magazines that you read occasionally? (Probe for up to 5)

Q8. IF NO SCIENCE MAGAZINES HAVE BEEN MENTIONED, ASK: Do you ever read any science magazines? IF YES: Which ones? (collect up to 3)

Q9. Altogether, on an average day, about how many hours would you say that you watch television?

Q10. Now, I'd like to read you a short list of television shows and ask you to tell me whether you watch each show regularly -- that is, most of the time (1), occasionally (2), or not at all (3). Ok?

Q10a. 60 Minutes

Q10b. Nova

Q10c. National Geographic Specials

Q10d. A morning television news show

Q10e. An evening television news show

Q10f. A late night news show.

Q11. Now, let me ask you about your use of museums, zoos, and similar institutions. I am going to read you a short list of places and ask you to tell me how many times you visited each type of place during the last year, that is, the last 12 months. If you did not visit any given place, just say "none".

Q11a. A science or technology museum.

Q11b. A zoo or aquarium.

Q11c. A natural history museum.

Q11d. An art museum.

Q11e. A public library.

Q12. Now, let me turn to a slightly different type of question. When you read news stories, you encounter certain sets of words and terms. We are interested in how many people recognize certain types of terms and I would like to ask you a few brief questions in that regard.

Q12a. First, some articles refer to the results of a scientific study. When you read or hear the term "scientific study" do you have a clear understanding of what it means (1), a general sense of what it means (2), or little understanding of what it means (3)?

Q12b. If previous response is 1 or 2: In your own words, could you tell me what it means to study something scientifically?

Interviewer will enter actual response.

Q12c. Next, in articles and on television news shows, the term "DNA" has been used. When you hear the term "DNA" do you have a clear understanding of its meaning (1), a general sense of what it means (2), or little understanding of what it means (3)?

Q12d. Molecule. When you read or hear the term "molecule" do you have a clear understanding of its meaning (1), a general sense of what it means (2), or little understanding of what it means (3)?

Q12b. If previous response is 1 or 2: In your own words, could you tell me what a molecule is?

Q12e. Computer software. When you read or hear the term "computer software" do you have a clear understanding of its meaning (1), a general sense of what it means (2), or little understanding of what it means (3)?

Q12f. "Radiation." When you read or hear the term "radiation" do you have a clear understanding of its meaning (1), a general sense of what it means (2), or little understanding of what it means (3)?

Q12g. Finally, "GNP." When you read or hear the term "GNP" do you have a clear understanding of its meaning (1), a general sense of what it means (2), or little understanding of what it means (3)?

Q12h. On a related matter, please think about the telephone we are using. Would you say that you have a clear understanding of how a telephone works, a general sense of it, or little understanding of it?

Q12i. If clear understanding or general sense: Can you tell me in your own words how a telephone works?

Interviewer will enter actual response.

Q13. Now, I would like to read you some statements like those you might find in a newspaper or magazine article. For each statement, please tell me if you generally agree or generally disagree. If you feel especially strongly about a statement, please say that you STRONGLY AGREE or STRONGLY DISAGREE with the statement. Ok?

Q13a. Science and technology are making our lives healthier, easier, and more comfortable.

Q13b. There will always be wars, no matter how hard people try to prevent them.

Q13c. The quality of science and mathematics education in American schools is inadequate.

Q13d. Rocket launchings and other space activities have caused changes in our weather.

Q13e. The interested and informed citizen can often have some influence on government policies toward science if he or she is willing to make the effort.

Q13f. Scientists will never be able to understand the working of the human mind as well as they understand the physical world.

Q13g. If scientific knowledge is explained clearly, most people will be able to understand it?

Q13h. Human beings as we know them today developed from earlier species of animals.

Q13i. Smoking causes serious health problems.

Q13j. There are some good ways of treating sickness that medical science does not recognize.

Q13k. In the entire universe, it is likely that there are thousands of planets like our own on which life could have developed.

Q13l. Because of their knowledge, scientific researchers have a power that makes them dangerous.

Q13m. It is not wise to plan ahead because many things turn out to be a matter of good or bad luck anyway.

Q13n. The continents on which we live have been moving their location for millions of years and will continue to move in the future.

Q13o. By taking an active part in political and social affairs, people can control world events.

Q13p. Some numbers are especially lucky for some people.

Q13q. Scientific researchers are dedicated people who work for the good of humanity.

Q13r. One trouble with science is that it makes our way of life change too fast.

Q13s. Even if it brings no immediate benefits, scientific research which advances the frontiers of knowledge is necessary and should be supported by the federal government.

Q13t. It is likely that some of the unidentified flying objects that have been reported are really space vehicles from other civilizations.

Q13u. One of the bad effects of science is that it breaks down people's ideas of right and wrong.

Q13v. In this complicated world of ours, the only way we can know what is going on is to rely on leaders and experts who can be trusted.

Q13w. New inventions will always be found to counteract any harmful consequences of technological development.

Q13x. We depend too much on science and not enough on faith.

Q13y. Every high school student in the United States should be required to take a science course every year.

Q13z. Every high school student in the United States should be required to take a math course every year.

Q14. Now, I'd like to turn to some questions about the impact of science and technology on the economy. I will read you some statements that people have made about science, engineering, and the economy. For each statement, please tell me if you agree or disagree. If you feel especially strongly about a statement, please tell me that you STRONGLY AGREE or STRONGLY DISAGREE. Ok?

Q14a. Factory automation will put many hundreds of thousands of factory employees out of work in this country in the next five years.

Q14b. If we don't automate our factories, American products will be too expensive to compete successfully against products made in automated factories in Japan and Europe.

Q14c. One of the main reasons why there is high unemployment in this country is that technological developments have put many Americans out of work.

Q14d. With the application of science and new technology, work will become more interesting.

Q14e. On balance, computers and factory automation will create more jobs than they will eliminate.

Q14f. Because of science and technology, the rich will get richer and the poor will get poorer.

Q14f. Because of science and technology, there will be MORE opportunities for the next generation.

Q15. Now, for a different type of question. People have frequently noted that scientific research has produced both beneficial and harmful consequences. Would you say that, on balance, the benefits of scientific research have outweighed the harmful results (1), or have the harmful results of scientific research been greater than its benefits (3)?

Interviewer will accept "about equal" as response (2), but will not suggest it.

Would you say that the balance has been strongly in favor of (beneficial/harmful) consequences (1), or only slightly (2)?

Q16. Now, I want to read you a short list of areas and for each one, please tell me if you think that science and technology have had a positive effect, a negative effect, or neither kind of effect?

Our standard of living.

General working conditions.

The public health.

World peace.

People's moral values.

The individual's enjoyment of life.

Q17. Thinking back over the last 10 years -- that is, since 1975 -- What do you think was the most important scientific or technological achievement in the United States?

What would you say was the second most important scientific or technological achievement?

Q18. Many current issues in science and technology may be viewed as a judgment of relative risks and benefits, or costs and benefits. Thinking first about the space program, some persons have argued that the costs of the space program have exceeded its benefits, while other people have argued that the benefits of space exploration have exceeded its cost. In your opinion, have the costs of space exploration exceeded its benefits (1), or have the benefits of space exploration exceeded its costs (3)?

Interviewer will accept "about equal" (2) as a response, but will not suggest it.

If previous response is 1: Would you say that the costs substantially (2) exceed the benefits, or only slightly (1) exceed the benefits?

If previous response is 3: Would you say that the benefits substantially (2) exceed the costs, or only slightly (1) exceed the costs?

Q19. In a similar framework, some persons have argued that the creation of new life forms through genetic engineering research constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your own opinion, are the risks of genetic engineering research greater than its benefits (1), or are the benefits greater than the risks (3)?

Interviewer will accept "about equal" (2) as a response, but will not suggest it.

If previous response is 1: Would you say that the risks are substantially greater than the benefits (2), or only slightly greater that the benefits (1)?

If previous response is 3: Would you say that the benefits are substantially greater than the risks (2), or only slightly greater than the risks (1)?

Q20. In the current debate over the use of nuclear reactors to generate electricity, there is broad agreement that there are some risks and some benefits associated with nuclear power. In your own opinion, are the risks greater than the benefits (1), or are the benefits greater than the risks (3)?

Interviewer will accept "about equal" (2) as a response, but will not suggest it.

If previous response is 1: Would you say that the risks are substantially greater than the benefits (2), or only slightly greater that the benefits (1)?

If previous response is 3: Would you say that the benefits are substantially greater than the risks (2), or only slightly greater than the risks (1)?

Q21. Now, let me ask you a couple of questions about computers. First, do you presently own a home computer?

Q21a. IF YES: What kind of computer would that be?

> Note: In this question, the respondent is asked the name of his/her computer. Some respondents may provide a brand name and a model number. This information will be used to code the size and type of computer. In a 1983 study for the Annenberg School of Communication at the University of Pennsylvania, we asked each respondent who reported owning a home computer to indicate whether the machine had more or less than 36K of central processing capacity. We found numerous owners who did not know the exact size of the machine. We believe that this approach will provide a more effective means to differentiate between a multipurpose home computer and a television game device. The brand name will not be retained in the final analysis file and we have no commercial interest in the brand-name data.

Q21b. IF OWNS COMPUTER: What do you use it for primarily?

Q21c. IF OWNS COMPUTER: About how many hours do you personally use your home computer in a typical week?

Q21d. IF NO: Have you seriously considered buying a home computer at any time during the last year?

Q21e. IF CONSIDERED BUYING: If you bought a home computer, what would you use it for primarily?

Q21f. Do you use a computer in your work?

Q21g. IF YES: About how many hours do you personally use your work computer in a typical week?

Q22. Now, let me ask you to think about the long-term future. I am going to read you a list of possible results and ask you how likely you think it is that each of these results will be achieved in the next 25 years or so.

Q22a. A safe method for the long-term storage or disposal of waste products from nuclear power plants. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all that this result will be achieved within the next 25 years?

Q22b. The placement of a scientific or mining colony on the moon. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this result will be achieved within the next 25 years?

Q22c. Another nuclear power plant accident like Three-Mile Island. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this will occur within the next 25 years or so?

Q22d. A cure for the common forms of cancer. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this result will be achieved within the next 25 years?

Q22e. The accidental release of a genetically-engineered microbe into the environment. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this result will occur within the next 25 years?

Q22f. A war in space. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this result will occur within the next 25 years?

Q22g. The development of genetically-engineered bacteria to eat or destroy toxic chemicals. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this result will be achieved within the next 25 years?

Q22h. The landing of a manned mission on Mars. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this result will be achieved within the next 25 years?

Q22i. The accidental release in the United States of a toxic chemical that will result in numerous deaths. Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this result will occur within the next 25 years?

Q22j. A cure for the disease AIDS? Do you think that it is very likely (3), possible but not too likely (2), or not likely at all (1) that this result will occur within the next 25 years?

Q23. Next, let me ask you about the types of studies that scientists ought to be able to conduct. Some people are worried that scientists are studying problems that should be left alone. Other people feel that it is a bad idea to limit the kinds of things that scientists can study. I'm going to read you a short list of studies that have caused some debate. For each study, please tell me whether you think scientists should or should not be allowed to conduct that kind of research. If you don't care one way or the other, just give me that answer. Ok?

Q23a. First, studies that might enable most people in society to live to be a hundred or more. Should scientists be allowed to conduct this type of study or not?

Q23b. Studies that might lead to precise weather control and weather modification.

Q23c. Studies that might allow scientists to create new forms of plant and animal life?

Q23d. Studies that might discover intelligent beings in outer space.

Q23e. Studies that cause pain or injury to animals like dogs and chimpanzees, but which produce new information about human disease or health problems.

Q23f. Studies that are designed to create new biological or chemical weapons.

Q24a. Do you ever read a horoscope or your personal astrology report?

Q24b. IF YES: Do you read an astrology report every day, quite often, just occasionally, or almost never?

Q24c. Would you say that astrology is very scientific, sort of scientific, or not scientific at all?

Q24d. In your daily life, do you sometimes decide to do or not do somthing because your astrological signs for the day are favorable or unfavorable?

Q25. We are faced with many problems in this country. I'm going to name some of these problems, and for each one I'd like you to tell me if you think the government is spending too much money on it (1), too little money on it (3), or about the right amount (2).

Q25a. Exploring space. Are we spending too much (1), too little (3), or about the right amount (2) on exploring space?

Q25b. Reducing and controlling pollution. Are we spending too much (1), too little (3), or about the right amount (2) on reducing and controlling pollution?

Q25c. Improving health care. Are we spending too much (1), too little (3), or about the right amount (2) on improving health care?

Q25d. Conducting scientific research. Are we spending too much (1), too little (3), or about the right amount (2) on conducting scientific research?

Q25e. Improving education. Are we spending too much (1), too little (3), or about the right amount (2) on improving education?

Q25f. Helping older people. Are we spending too much (1), too little (3), or about the right amount (2) on helping older people?

Q25g. Developing or improving weapons for national defense. Are we spending too much (1), too little (3), or about the right amount (2) on developing or improving weapons for national defense?

Q25h. Helping low-income persons. Are we spending too much (1), too little (3), or about the right amount (2) on helping low-income persons?

Q26. The federal government is a major source of financial support for scientific and engineering research. Thinking of the federal government, which agencies or departments to you think provide the largest amount of support for scientific research? (Probe for up to 3)

Q27. Thinking of the federal government again, which agencies or departments do you think provide the largest amount of support for engineering research? (probe for up to 3)

Q28. Now, let me read you a short list of agencies and groups that provide some support for scientific or engineering research and for each one, as I read it please tell me if you have heard of it before.

Q28a. The National Institutes of Health

Q28b. The Ford Foundation.

Q28c. The Rockefeller Foundation

Q28d. The Department of Energy

Q28e. The National Science Foundation

Q29a. IF R HAS HEARD OF THE NSF, ASK: Is the National Science Foundation a government agency or a private foundation?

Q29b. IF R HAS HEARD OF THE NSF, ASK: What is the primary purpose or activity of the National Science Foundation?

IF R NAMES ONE PURPOSE OR ACTIVITY, ASK: Can you think of a second purpose or activity of the National Science Foundation?

Q30. Now, I'd like to turn to the general issue of governmental regulation. I'm going to read you a short list of activities and for each one I'd like for you to tell me whether you think that the present level of governmental regulation is too high (3), too low (1), or about right (2).

Q30a. First, the development of new pharmaceutical products. Is the present level of governmental regulation too high (3), too low (1), or about right (2)?

Q30b. Next, the construction of nuclear power plants. Is the present level of governmental regulation too high (3), too low (1), or about right (2)?

Q30c. The conduct of basic scientific research. Is the present level of governmental regulation too high (3), too low (1), or about right (2)?

Q30d. The use of chemical additives in foods. Is the present level of governmental regulation too high (3), too low (1), or about right (2)?

Q30e. The conduct of genetic engineering research. Is the present level of governmental regulation too high (3) too low (1), or about right (2)?

Q31. Now, let me ask you to think about the relative position of the United States in the world in regard to science and technology.

Q31b. In terms of BASIC SCIENTIFIC ACHIEVEMENTS, would you say that the United States is ahead of West Germany, behind West Germany, or at about the same level?

Q31b. In terms of BASIC SCIENTIFIC ACHIEVEMENTS, would you say that the United States is ahead of France, behind France, or at about the same level?

Q31c. In terms of BASIC SCIENTIFIC ACHIEVEMENTS, would you say that the United States is ahead of Japan, behind Japan, or at about the same level?

Q31d. In terms of BASIC SCIENTIFIC ACHIEVEMENTS, would you say that the United States is ahead of Great Britain, behind Great Britain, or at about the same level?

Q31e. In terms of BASIC SCIENTIFIC ACHIEVEMENTS, would you say that the United States is ahead of the Soviet Union, behind the Soviet Union, or at about the same level?

Q32a. In terms of MILITARY TECHNOLOGY, would you say that the United States is ahead of West Germany, behind West Germany, or at about the same level?

Q32b. In terms of MILITARY TECHNOLOGY, would you say that the United States is ahead of France, behind France, or at about the same level?

Q32c. In terms of MILITARY TECHNOLOGY, would you say that the United States is ahead of Japan, behind Japan, or at about the same level?

Q32d. In terms of MILITARY TECHNOLOGY, would you say that the United States is ahead of Great Britain, behind Great Britain, or at about the same level?

Q32e. In terms of MILITARY TECHNOLOGY, would you say that the United States is ahead of the Soviet Union, behind the Soviet Union, or at about the same level?

Q33a. In terms of CIVILIAN OR INDUSTRIAL TECHNOLOGY, that is, technology to produce television sets, automobiles, or other non-military goods, would you say that the United States is ahead of West Germany, behind West Germany, or at about the same level?

Q33b. In terms of CIVILIAN OR INDUSTRIAL TECHNOLOGY, would you say that the United States is ahead of France, behind France, or at about the same level?

Q33c. In terms of CIVILIAN OR INDUSTRIAL TECHNOLOGY, would you say that the United States is ahead of Japan, behind Japan, or at about the same level?

Q33d. In terms of CIVILIAN OR INDUSTRIAL TECHNOLOGY, would you say that the United States is ahead of Great Britain, behind Great Britain, or at about the same level?

Q33e. In terms of CIVILIAN OR INDUSTRIAL TECHNOLOGY, would you say that the United States is ahead of the Soviet Union, behind the Soviet Union, or at about the same level?

Q34. Now a couple of related questions. During the last year, have you written to or spoken to any public official or legislator about some personal problem you had --like, about a Social Security check, or an immigration ruling, or something personal like that?

Q35a. During the last year, have you written to or spoken to any public official or legislator about any political issue or problem -- not counting the more personal kinds of problems that I just asked you about?

Q35b. If yes: About how many times did you contact a public official or legislator about a political issue during the last year?

Q35c. If 1 or more: Can you recall an (another) issue that you made a contact about? (Probe for 3).

Q36. Generally speaking, do you think that letters and telegrams to public officials in Washington are very effective (1), somewhat effective (2), or mostly ineffective (3)?

Q37. Are you currently registered to vote?

Q38. Did you vote in the 1984 presidential election?

Now, let me ask you a few brief questions about yourself.

Q39. First, are you currently married (1), widowed (2), divorced (3), separated (4), or have you never been married (5)?

Q40. If married before: Do you have any children? (If yes) How many?

Q41. Do you have any children under age 18 who currently live with you? (If yes) How many?

Q42. IF YES: Have any of your children watched the television show 3-2-1 CONTACT on a regular basis? How many?

Q43. Did you ever get a high school diploma or a GED?

Q44. If yes: Do you have any college degrees? What is your highest degree?

Q45. For highest degree: In what field was that degree?

Q46. Have you ever taken any college-level courses in biology, chemistry, or physics? IF YES: How many? IF YES: How many?

Q47. Have you ever taken any college-level courses about or using computers? IF YES: How many?

Q48. Last week, were you working full-time, working part-time, going to school, or what?

Codes:

working full-time	1
working part-time	2
has job, but ill, on vacation or strike	3
unemployed, laid off, looking for work	4
retired	5
in school	6
keeping house	7
other	8
DK or NA	9

Q49. IF EMPLOYED: What kind of work do you normally do?

What is your job called?

Note: Interviewer will use preceding set of inquiries to enter occupational code into the computer terminal.

Q50. Does the organization or firm for which you work conduct or sponsor any scientific or technological research?

Q51. IF MARRIED: Did your husband/wife ever get a high school diploma or a GED?

Q52. IF YES: Does he/she have any college degrees? What is his/her highest degree?

Q53. IF DEGREE: In what field was that degree?

Q54. IF MARRIED: Last week, was your husband/wife working full-time, working part-time, going to school, or what?

Codes:

working full-time	1
working part-time	2
has job, but ill, on vacation or strike	3
unemployed, laid off, looking for work	4
retired	5

in school 6
keeping house 7
other 8
DK or NA 9

Q55. IF SPOUSE EMPLOYED: What kind of work does your husband/wife do?

What is that job called?

Q56. IF SPOUSE EMPLOYED: Does the organization or firm for which your husband/wife works conduct or sponsor any scientific or technological research?

Q57. Now, let me read you a short list of groups and organizations and ask you to tell me whether or not you are a member.

Q57a. a church or religious group.

Q57b. a PTA or other school related group.

Q57c. a community service club or organization.

Q57d. a union.

Q57e. a professional or occupational group other than a union.

Q57f. any group primarily concerned about environmental problems.

Q57g. a chamber of commerce or a business group.

Q58. Thinking back to the time you were a high school student, did you live in a central city, a suburb, a smaller town that was not a part of a metropolitan area, or in a rural area?

Q59. What race do you consider yourself?

science indicators literature data base

purpose and background

This data base describes publication and citation activity in the leading research journals for physical and biological sciences that are carried in the *Science Citations Index* (SCI) of the Institute for Scientific Information.

survey instrument

The data base is used to construct 13 bibliometric indicators of international and domestic scientific activity, including national publication counts, national citation indicators, international coauthorships, etc. Fields covered by the survey include biology, chemistry, physics, earth and space sciences, engineering and technology, psychology, mathematics, clinical medicine, and biomedicine.

survey design

The journals carried in the SCI are the largest, most cited journals in the physical and biological sciences and cover virtually all the significant world research literature in these fields. The 1973 SCI data base covers publication activity in 2,100 journals; the 1981 data base covers activity in the approximately 3,000 journals. The data base is separated into two fixed sets of journals so that comparisons can be made over time.

data availability

In most cases, these data are available for the years 1973 through 1984 for the 1973 journal set, and for 1981 and 1984 using the 1981 journal set. Data for psychology are only available for 1973-77.

data access

A complete description of the data base is contained in the publication, *Data User's Guide to the National Science Foundation's Science Literature Data Base* [1980]. This publication is available from the Science Indicators Study Group/Division of Science Resources Studies (202) 634-4682. Inquiries regarding this data should be addressed to:

Mr. Jason Christian
Division of Science Resources Studies
Science Indicators Studies Group
National Science Foundation
1800 G Street, N.W., Rm. L611
Washington, D.C. 20550
(202) 634-4682

Data tapes for one or a set of indicators may be ordered from:

Computer Horizons, Inc.
1050 Kings Highway North
Cherry Hill, New Jersey 08034
(609) 779-0911

Indicators Series 1 which describes publications by year, nationality, and detailed field of science costs $1,100; all additional indicators series are provided for an additional $1,100. Shipping costs are charged separately.

counts of patents applied for and granted in the united states

purpose and background

The purpose of these data is to obtain information on the stream of new technical inventions that may eventually be embodied in new or improved products, processes, and services. While inventions cannot be directly counted or measured, patents taken out on new inventions can. The number of patents, therefore, is used as a surrogate measure of the numbers of inventions themselves. Data on patents are provided by the Office of Documentation, U.S. Patent and Trademark Office.

survey instrument

Patent counts are classified by nationality of inventor and class of owner (individual, U.S. Government, U.S. corporations, foreign government, foreign corporation). They are also classified by field of technology (product field) by use of a computer concordance developed under National Science Foundation sponsorship. Special tabulations have been made of patenting by universities and colleges and patenting in special technology fields.

survey design

All patents granted in the United States are covered. They are tabulated both by year granted and year of application.

data availability

Reports containing patent tabulations are updated annually, and generally cover the period from 1963 to 1984.

data access

The 1983 Patent Office reports include earlier data and are available in microfiche form. Copies can be obtained from:

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Inquiries can be made to the Patent and Trademark Office and should be directed to:

Mrs. Jane Myers
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U.S. Patent and Trademark Office
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